7-11-2015

The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living

Emily Anne Guerin
University of Windsor

The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living

by

Emily A. Guerin

A Thesis
submitted to the Faculty of Graduate Studies
through the Department of Kinesiology
in Partial Fulfillment of the Requirements for
the Degree of Master of Human Kinetics
at the University of Windsor

Windsor, Ontario, Canada

2015

The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living

by

Emily A. Guerin

APPROVED BY:

_____

Dr. L. De Witt
Faculty of Nursing

_____

Dr. T. Loughead
Department of Kinesiology

_____

Dr. K. Chandler, Advisor
Department of Kinesiology

May 21, 2015

DECLARATION OF ORIGINALITY

I hereby certify that I am the sole author of this thesis and that no part of this thesis has been published or submitted for publication.

I certify that, to the best of my knowledge, my thesis does not infringe upon anyone's copyright nor violate any proprietary rights and that any ideas, techniques, quotations, or any other material from the work of other people included in my thesis, published or otherwise, are fully acknowledged in accordance with the standard referencing practices. Furthermore, to the extent that I have included copyrighted material that surpasses the bounds of fair dealing within the meaning of the Canada Copyright Act, I certify that I have obtained a written permission from the copyright owner(s) to include such material(s) in my thesis and have included copies of such copyright clearances to my appendix.

I declare that this is a true copy of my thesis, including any final revisions, as approved by my thesis committee and the Graduate Studies office, and that this thesis has not been submitted for a higher degree to any other University or Institution.

ABSTRACT

Imagery has been shown to be an effective technique to enhance numerous forms of cognition and behavioral outcomes (Hall, 2001; Taylor & Schneider, 1989). Despite its effectiveness, little is known about imagery use in older adults (Kalicinski & Lobinger, 2013). The purpose of this study was to examine the use and impact of mental imagery by older adults on their activities of daily living (ADL) and instrumental activities of daily living (IADL). Participants (N= 14) took part in a four week imagery intervention, and completed pre and post questionnaires that assessed physical ability for performing ADL and IADL, self-efficacy for performing ADL and IADL, and imagery ability. Wilcoxon signed rank tests revealed a significant difference for visual imagery ability ($Z = -2.21$, $p < 0.05$), with participants demonstrating improved visual imagery post-intervention. The findings from the current study provide further support for the use of imagery with older adult populations.

ACKNOWLEDGMENTS

This thesis would not have been possible without the guidance and support of many different individuals. First and foremost, I would like to thank my advisor, Dr. Krista Chandler. I am extremely grateful to have had the opportunity to work with you throughout my Master's program. Your ongoing guidance and encouragement throughout this process has been invaluable. I would also like to thank Dr. Todd Loughead for his feedback and guidance on my thesis. It has been a privilege being able to work with you. To Dr. Lorna De Witt, thank-you for being part of my thesis committee. Your comments and suggestions were very helpful and greatly appreciated. Finally, I would like to thank my collaborator at the University of West Virginia, Dr. Peter Giaccobi. Your suggestions and insightful comments regarding this area of research were incredibly helpful.

I would also like to thank the members of the Sport and Exercise Psychology lab. It has been a privilege working with all of you. I am extremely fortunate to have had the opportunity to work with such a wonderful group of people.

Further, I would like to thank all of my family and friends for their continuous support throughout my Master's program. I would also like to give a special thanks to my roommate for all of her help throughout this process.

Finally, I would like to thank all of my research participants. Without their ongoing commitment this thesis would not have been possible. I would also like to thank all of the staff and members at Life After Fifty, as well as Cantebury ElderCollege, for their assistance throughout the completion of my thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

RESARCH ARTICLE

Introduction

The older adult population, persons aged 65 and over, is increasing at an accelerated rate (Statistics Canada, 2013) due primarily to decreased fertility and increased longevity (Munnell, 2004). In addition, the oldest of the baby-boom cohort has reached 65 years of age, thereby further contributing to the rapid increase in the number of older adults (Statistics Canada, 2011). Given that 5.3 million Canadians are aged 65 or over (Statistics Canada, 2013), it is imperative to explore effective self-management tools for older adults to implement in order to prevent, delay, or reduce functional disability (Penninx et al., 2001), and maintain independence.

Preventing or reducing functional disability in older adults has been identified as an important health concern (Gobbens & van Assen, 2014; Guralnik, Fried, & Sallive, 1996); particularly because functional disability has been found to be associated with the use of formal and informal home services (Penninx et al., 2001), nursing home admission (Fortinsky, Covinsky, Palmer, & Landefeld, 1999), and hospitalization (Mor, Wilcox, Rakowski, & Hiris, 1994). Consequently, it is essential to develop and test interventions that can prevent or reduce functional disability, specifically in activities of daily living (ADL) and instrumental activities of daily living (IADL). ADL are defined as basic self-maintenance tasks, which include eating, dressing, bathing, toileting, transferring into or out of a bed or chair, and getting around the house (Fillenbaum, 2001). IADL are defined as the more complex tasks required for carrying out the business of daily life, which include preparing meals, shopping, managing money, doing housework, using the telephone, and taking medications (Lawton & Brody, 1969). Therefore, disability in ADL and IADL refers to the difficulty or inability to perform these activities (Phelan, Williams, Penninx, LoGerfo, & Leveilles, 2004).

Disability in ADL and IADL is a dynamic process; that is, older adults may develop disability and recover from a period of disability (Hardy & Gill, 2004; Martel, Belanger, & Berthelot, 2002). Disability generally occurs in IADL, the more complex tasks required for carrying out the business of daily life, prior to developing disability in ADL (Fillenbaum, 2001). In addition, multiple factors contribute to disability in ADL and IADL; specifically, increased age, number of chronic health conditions, lifestyle characteristics, such as amount of alcohol consumption, smoking, and physical activity participation, and living arrangements have all been found to potentially contribute to disability in ADL and IADL (e.g., Den Ouden et al., 2013; Martel et al., 2002; Wang et al., 2002).

A number of the current intervention designs implemented to prevent or reduce ADL and IADL disability in older adults involve the use of physical therapy or exercise (e.g., Alexander et al., 2001; Gill et al., 2002; Lord et al., 2003; Luukinen et al., 2006). Gill et al. (2002) conducted a six month, home-based trial, designed to prevent functional decline in ADL of older adults. Participants, aged 75 years or older, were randomly assigned to a control or intervention group. Those in the control group completed an educational program, whereas those in the intervention group completed physical therapy that focused on improving impairments in physical abilities, including balance, muscle strength, ability to transfer from one position to another, and mobility. Those in the intervention group were found to display less functional decline over time compared to those in the control group (Gill et al., 2002); therefore, suggesting physical therapy as an intervention to prevent or reduce functional decline in older adults is an effective strategy.

Further interventions designed to improve functional ability have examined the effect of resistance-training on performance. Specifically, Alexander et al. (2001) designed an intervention which involved the completion of a 12-week, task-specific resistance-training

program to improve the ability of older adults to rise from a bed and a chair. Participants that completed the task-specific resistance-training intervention were found to have increased their overall ability to rise from a bed and from a chair, and were further found to decrease their rise time (Alexander et al., 2001).

Taken together, the aforementioned studies provide support for the effectiveness of physical interventions designed to prevent or reduce functional disability. However, not all older adults may be capable of performing the physical activity behaviours required of the experimental groups (i.e., exercise or resistance training) due to mobility impairments; therefore, further research is warranted to determine effective interventions to implement with older adults that may have mobility impairments. Imagery has been found to be an effective method to enhance numerous forms of cognition and behavioural outcomes (Hall, 2001). Therefore, imagery may prove to be an effective intervention strategy to implement with older adults, with or without mobility impairments, to prevent or reduce functional disability in ADL and IADL.

Imagery has been defined as:

> an experience that mimics real experience. We can be aware of "seeing" an image, feeling movements as an image, or experiencing an image of smell, tastes, or sounds without actually experiencing the real thing… It differs from dreams in that we are awake and conscious when we form an image. (White & Hardy, 1998, p. 389)

Imagery is a psychological skill that has long been used by athletes and coaches to enhance performance (Munroe, Giacobbi, Hall, & Weinberg, 2000); however, imagery is gaining popularity in other domains including dance, exercise, and the rehabilitation setting (Cumming & Williams, 2013). Despite the effectiveness and widespread use of imagery in these domains,

relatively little is known about imagery use in healthy older adults (Kalicinski & Lobinger, 2013).

Older adults with or without mobility impairments may be able to employ imagery to prevent or reduce functional disability in ADL and IADL. Specifically, imagery has been found to enhance learning and performance (e.g., Page, Levine, Sisto, & Johnston, 2001; Tunney, Arnold, & Gimbel, 2011), self-efficacy (e.g., Giacobbi et al., 2014; Wesch, Milne, Burke, & Hall, 2006), and decrease stress and anxiety (Kim & Giacobbi, 2009) in a number of different tasks performed by middle to older aged adults. Furthermore, an outcome of imagery (i.e., enhanced learning and performance, self-efficacy, or decreased stress and anxiety) is strongly influenced by the vividness, accuracy, and temporal characteristics of an image. Older adults have been found to be capable of forming vivid and accurate images, and those who perform simple and regular movements are highly capable of reproducing the temporal characteristics of the movements during an image (Saimpont et al., 2013). As a result, imagery may prove to be an effective self-management tool for older adults with or without mobility impairments to implement.

A study supporting the use of imagery to enhance and facilitate the learning and performance of a novel task with older adults was conducted by Tunney et al. (2011). Three community-dwelling older adults were examined to determine if they were capable of learning a floor-to-chair transfer through imagery. Participants (76-89 years) completed one session of physical practice of the floor-to-chair transfer, received training in imagery, and a six week home exercise program for imagery. Following the completion of the 6-week imagery intervention, all three participants indicated that the home exercise program for imagery had a positive impact on

their performance of the floor-to-chair transfer. Furthermore, all participants maintained or improved their performance of the floor-to-chair transfer after a 6-week non-intervention period.

Giacobbi et al. (2014) examined the content and perceived utility of imagery by 24 older adults (M_{age} = 65, *SD* = 8.79 years) involved in an Active Adult Mentoring Program (AAMP), a physical activity intervention delivered by peer volunteers from the community. The AAMP sessions were digitally recorded and interviews were conducted with participants following the completion of the physical activity intervention. Following analysis of the AAMP sessions, nine themes were identified regarding older adults' use of imagery, including: appearance, exercise technique, exercise self-efficacy, exercise feelings, exercise routines, exercise content, negative views, positive experiences, and dissociation. Furthermore, following analysis of the interviews, four additional themes were identified including: positive experiences using imagery, negative views regarding imagery, previous imagery experiences, and comments about mentors. Finally, 13 participants reported perceiving imagery as helpful and stated they would continue utilizing imagery. However, nine participants stated imagery was challenging and did not perceive imagery to be beneficial. The nine participants who did not perceive imagery as beneficial reported having limited experiences with imagery, and suggested that mentors did not explain or justify imagery clearly. Therefore, further research examining older adults' acceptability of imagery is warranted.

An important finding of Giacobbi et al.'s (2014) study was the support for the use of imagery to enhance older adult's self-efficacy beliefs for exercise. Specifically, participants' responses during the physical activity intervention supported vicarious experiences, a source of self-efficacy. Participants reported re-experiencing satisfying exercise experiences during the physical activity intervention sessions; thereby increasing their self-efficacy for exercise. As

suggested by Giacobbi et al., it would be beneficial to examine imagery on different forms of physical activity behavior, particularly ADL and IADL.

Self-efficacy theory provides theoretical support for the use of imagery in physical activity contexts, thus providing support for physical activity behaviours, such as ADL and IADL. Bandura (1997) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). It is a situation-specific form of self-confidence that focuses on the extent to which an individual feels he or she will be successful in producing a specific outcome given their skills and the situation. Bandura further proposed that self-efficacy beliefs are constructed from four sources of information: mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states. All four sources of self-efficacy can be targeted through the use of imagery. Specifically, mastery experiences refer to an individual's cognitive reconstruction of a past performance and how they interpreted or perceived that performance (Bandura, 1997). Vicarious experiences refer to imaging oneself, or someone similar, perform a certain task. Verbal persuasion refers to a persuader expressing belief or doubt in an individual's capabilities to perform a task. Through feedback and communication with a persuader, an individual may produce images related to a task or behavior which may influence their self-efficacy beliefs. Finally, physiological and affective states, such as stress and anxiety, can influence an individual's self-efficacy beliefs prior to completing a task (Bandura, 1997).

Using self-efficacy theory as the foundation, the purpose of the current study was to examine the effect of a guided imagery intervention on older adults' ADL and IADL. Given imagery has been shown to increase older adults' physical abilities (e.g., Tunney et al., 2011) and self-efficacy (e.g., Giacobbi et al., 2014) to perform a number of tasks, it was hypothesized that

imagery would have a positive effect on older adults' physical ability and self-efficacy for performing ADL and IADL. In addition, it was further hypothesized that older adults' imagery ability, that is visual and kinesthetic imagery ability, would improve following the guided imagery intervention. Imagery may prove to be an effective self-management tool for older adults to implement to prevent, delay, or potentially reduce functional disability, and therefore to maintain independence.

Method

Participants

Participants included 14 independent, community-dwelling older adults from Windsor-Essex. Both males (N = 3) and females (N =11) were recruited for the current study. Participants ranged in age from 64-80 years (M_{age} = 72, SD = 5.2). Participants were recruited from various organizations within Windsor-Essex, such as Life After Fifty and Canterbury ElderCollege. Five participants reported that they had utilized imagery prior to the guided imagery intervention, whereas nine participants reported they had not utilized imagery prior to the guided imagery intervention. Those who reported using imagery prior to the current intervention indicated they used imagery while in the process of creating artwork and to imagine a finished product, while practicing and performing pieces of music, and while in the workforce to ensure the safe and correct execution of a task.

Measures

Demographics. Participants completed demographic questions at the beginning of the workshop (i.e., pre-intervention, week 1), including: age, gender, ethnicity, marital status, level of education, and if they had used imagery before (see Appendix A).

Imagery ability measurement. Participants' imagery ability was assessed with the Movement Imagery Questionnaire-Revised, Second Edition (MIQ-RS; see Appendix B). The MIQ-RS was developed by Gregg, Hall, and Butler (2007) to measure individual differences in both visual and kinesthetic imagery of a movement. Participants completed the MIQ-RS pre- and post-intervention (i.e., week 1 and week 6 of the intervention). The MIQ-RS is suitable to administer to individuals with or without mobility impairments. In addition, the functional tasks on the MIQ-RS require movements of both the upper and lower limbs, and therefore are more valid representations of individual's activities of daily living (Butler et al., 2012; Gregg et al., 2007). The MIQ-RS is composed of 14 items (7 visual and 7 kinesthetic), which are rated on a 7-point Likert scale ranging from 1 = *very difficult to see/feel* to 7 = *very easy to see/feel*. Participants were required to read a description of a movement, perform the movement, image that movement, and then rate their image. The MIQ-RS has been shown to have acceptable internal reliability with Cronbach's alpha coefficients of .87 for the visual subscale and .90 for the kinesthetic subscale (Gregg et al., 2007). In addition, it has been shown to have acceptable test-retest reliability and concurrent validity (Gregg et al., 2007). Finally, the MIQ-RS has been shown to be a valid and reliable measure to assess visual and kinesthetic movement imagery ability in young able-bodied individuals (Gregg et al., 2007), middle-to-older aged individuals (Butler et al., 2012), and stroke populations (Butler et al., 2012).

Self-efficacy measurement to perform ADL and IADL. Bandura (1997) recommended efficacy beliefs be measured under different levels of task demands, different situational circumstances, and across a variety of activity domains because perceptions of capability vary across realms of activities. Therefore, participants completed two task specific questions regarding their overall self-efficacy beliefs for performing ADL and IADL pre and post-

intervention (see Appendix C). The first question assessed participants' self-efficacy for performing IADL, and the second question assessed participants' self-efficacy for performing ADL. Participants were required to rate their self-efficacy for performing ADL and IADL on a 100-point scale, in 10-unit intervals, where 0 = *can not do*, 50 = *moderately certain can do*, and 100 = *certain can do* as recommended by Bandura (1997).

Performance of ADL and IADL. Participants' ability to perform ADL and IADL was assessed with the Older Americans' Resources and Services Activities of Daily Living Questionnaire (OARS ADL; Fillenbaum, 1996), which was administered pre-and post-intervention. The OARS ADL is a 14 item inventory, which assesses both ADL (7 items) and IADL (7 items) important for independent living in the community (see Appendix D). Participants rated each item of the OARS ADL on a 3 point scale: *performs the activity without help* (2), *performs the activity with some help* (1), *completely unable to perform the activity* (0), or *not answered* (-). A study conducted by Fillenbaum and Smyer (1981) found the OARS ADL to have high inter-rater reliability. In addition, McCusker, Bellavance, Cardin, and Belzile (1999) have found the OARS ADL to demonstrate construct validity.

Procedures

Recruitment. Approval was obtained from the Research Ethics Board of the University of Windsor. Older adults were recruited from various organizations within Windsor-Essex, such as Life After Fifty and Canterbury ElderCollege. Once permission was obtained to recruit (see Appendix E for letter to recruit at an organization), older adults were recruited through posters (see Appendix F) displayed at the organizations, and through face-to-face interaction (see Appendix G for verbal recruitment script) at the organizations either at the beginning or the end of an event. Older adults interested in participating in the study were provided with a letter of

information (see Appendix H) and a consent form (see Appendix I) to review. After reviewing the letter of information and the consent form, older adults still interested in participating were asked by the researcher to provide their contact information (see Appendix J), and were allowed to submit their consent form at that time if they so chose. Prospective participants' contact information was required to confirm participation and to arrange a suitable date and time for the workshop on imagery. Finally, participants were expected to complete and submit their consent form to the researcher at the beginning of the workshop (pre-intervention) if they had not done so prior.

Imagery Intervention

The intervention consisted of an imagery workshop (i.e., pre-intervention, week 1). At the beginning of the workshop, participants completed a baseline assessment; therefore, requiring the completion of a questionnaire package (i.e., demographics, the MIQ-RS, a measure of self-efficacy for performing ADL and IADL, and the OARS ADL). Furthermore, participants were provided with information regarding imagery, and were provided with guidance regarding the development of a personalized imagery script targeting their ADL and IADL performance. Following the workshop, participants were instructed to image performing their ADL and IADL (with their previously developed guided imagery script) for a period of 4-weeks (i.e., week 2, 3, 4, and 5 of the study), and to record the number of times that they had imaged throughout a day on a daily tracking sheet (see Appendix K for daily tracking sheet). Weekly reminders via telephone were provided to participants throughout the 4-weeks of the imagery intervention to ensure the participants were imaging performing their ADL and IADL regularly. Finally, at the end of the study (i.e., post-intervention, week 6) participants were required to complete a post-intervention assessment including the MIQ-RS, a measure of self-efficacy for performing ADL

and IADL, and the OARS ADL. A re-consent form (see Appendix L) was provided to participants to complete at the post-intervention, due to the extended length of time between contact with the researcher and participants.

Workshop. Participants attended a workshop on imagery prior to the commencement of the 4-week imagery intervention. The workshop took place at Life After Fifty, in a small, comfortable seminar room. The workshop was approximately 2-3 hours and refreshments were provided. The workshop was delivered in three stages. In Stage 1, participants completed the questionnaire package. Once participants completed the questionnaire package, they returned the questionnaire package to the researcher. Participants were then provided with a detailed definition of imagery and with information regarding the use and benefits of imagery. Ways to image most effectively were also discussed. Participants were instructed to use all five senses when they imaged, and to ensure that their images were vivid and controlled (Stage 2). Finally, participants were introduced to guided imagery scripts, and were required to personalize an imagery script (see Appendix M for an example imagery script), in conjunction with the researcher, targeting their performance in ADL and IADL (Stage 3).

Script development. Imagery scripts are "pre-planned descriptions of complete imagery scenarios, developed with the desired outcome of the imagery use in mind" that provide a structured method of implementing imagery (Cooley et al., 2013, p. 2). By using imagery scripts to guide imagery, individuals are able to develop more vivid and accurate images, and the imagery scripts help ensure that the correct function of imagery is being used to achieve the desired outcome (Cumming & Anderson, 2013). Moreover, imagery scripts can describe an "ideal" quality of image an individual aspires to develop through continual re-examination and repeated practice (Cooley et al., 2013).

A generic imagery script was developed as a guide, with the objective of enhancing physical ability and self-efficacy for performing ADL and IADL, respectively (see Appendix M). All the ADL and IADL selected to be included in the generic imagery scripts target questions from the OARS ADL questionnaire. The generic imagery script includes both stimulus and response propositions to ensure participants were able to generate vivid images (Lang, 1979). Furthermore, the generic imagery script was developed in conjunction with an expert researcher in the field of imagery. The generic imagery script was used as a guide, and participants were required to personalize the imagery script, in conjunction with the researcher, during the workshop on imagery. Personalized imagery scripts have been found to be more effective than generic imagery scripts (Cooley et al., 2013).

Script delivery. Participants were required to utilize their personalized imagery script to guide imaging performing their ADL and IADL for 4-weeks. The scripts were approximately five to ten minutes in length. Participants were instructed to read the imagery script a minimum of three times a week, once a day (Wakefield & Smith, 2009). However, participants were encouraged to read the script and image more frequently than the minimum recommendation, because it has been suggested that the amount of imagery use participants engage in be maximized throughout an intervention (Cooley et al., 2013). Furthermore, participants were provided with the choice of when and where to image.

Results

Data Screening Following the guidelines of Tabachnick and Fidell (2007), all variables were analyzed for accuracy of data entry, missing values, and outliers. A missing values analysis was conducted to determine the number of missing values in addition to the pattern of missing values. The values were missing completely at random and the missing values comprised less

than 1% of the data. Due to the small number of participants and the desire to retain data, the missing values were treated with a case mean substitution. Finally, the variables were examined and cleared of univariate outliers as indicated by the calculated z scores (Tabachnick & Fidell, 2007).

Next, the assumptions for dependent sample t-tests were examined (i.e., the dependent variables needed to be continuous and normally distributed, and the values needed to be from either one sample or two related samples; Field, 2013). The dependent variables were continuous and obtained from one sample; however, a number of the dependent variables were not normally distributed at baseline and post-intervention. Through further examination, it was determined that the variables were negatively skewed. Therefore, the variables were transformed to represent a positive skew prior to performing logarithmic transformations in order to try and obtain a normal distribution. Following the logarithmic transformations the dependent variables remained not normally distributed; as a result, the non-parametric Wilcoxon signed rank test was selected to analyze the data instead of the dependent sample t-tests. The Wilcoxon signed rank test was selected because it is the non-parametric equivalent to the dependent sample t-test and therefore has fewer restrictions (Field, 2013).

Preliminary Analyses

Prior to conducting the Wilcoxon signed rank test, frequencies and descriptives were calculated for the demographic information presented in Table 1. In addition, the means and standard deviations were calculated for the subscales of the OARS ADL, the measures of self-efficacy for performing ADL and IADL, and the MIQ-RS at baseline and post-intervention (See Table 2). All of the calculated means remained relatively stable and high from baseline to post-intervention. Specifically, the means for physical ability for performing ADL and IADL ranged

from 1.97 to 1.99, with the highest possible score being two. The means for self-efficacy for performing ADL and IADL ranged from 95.71 to 99.29, with the highest possible score being 100. Finally, the means for imagery ability (i.e., including visual and kinesthetic imagery) ranged from 5.35 to 6.34, with the highest possible score being seven.

Alpha coefficients were calculated for the subscales of the MIQ-RS at baseline and post-intervention. At baseline, the alpha coefficients for the MIQ-RS were 0.92 for the visual subscale and 0.98 for the kinesthetic subscale. At post-intervention the alpha coefficients for the MIQ-RS were 0.82 for the visual subscale and 0.91 for the kinesthetic subscale. Single item measures were used to assess self-efficacy for performing ADL and IADL; therefore, alpha coefficients were not calculated. Finally, due to no variance or limited variance across participants' scores at baseline and post-intervention, alpha coefficients for the subscales of the OARS ADL (i.e., ADL and IADL) resulted in negative numbers, and therefore were reported as zero (Henson, 2001). As a result of the zero alpha coefficients, and following the recommendation of other researchers (e.g., Doble & Fisher, 1998; Kempen et al., 1996), the subscales of the OARS ADL were collapsed, resulting in a unidimensional measure for ADL and IADL ability. When analyzed collectively, the alpha coefficient for the OARS ADL at baseline was 0.35 and at post-intervention it was 0.41. The alpha coefficients for the OARS ADL were poor individually and collectively; however, due to support from previous research (i.e., Doble & Fisher, 1998; Kempen et al., 1996), the subscales of the OARS ADL remained collapsed for the primary analysis. As such, the overall means for OARS ADL were 1.98 and 1.97 at baseline and post-intervention, respectively (See Table 2).

Finally, participants completed a daily tracking sheet throughout the imagery intervention. The majority of participants (i.e., 12) reported imaging one to two times a day over

the four week imagery intervention. Two participants did not record the number of times that they imaged throughout a day on their tracking sheet; however, the two participants verbally reported that they imaged one to two times a day throughout the guided imagery intervention (E. A. Guerin, personal communication, March 4, 2015; E. A. Guerin, personal communication, March 9, 2015).

Primary Analyses

The Wilcoxon signed rank tests revealed no significant differences between baseline and post-intervention for six of the seven dependent variables (*p*s > .05): physical ability for performing ADL, physical ability for performing IADL, self-efficacy for performing ADL, self-efficacy for performing IADL, and kinesthetic imagery. Even after collapsing the OARS ADL, there was still no significant difference from baseline to post-intervention ($p > .05$). However, a significant difference was found for visual imagery ($Z = -2.21$, $p < 0.05$) with participants demonstrating improved visual imagery post-intervention.

Discussion

The purpose of the current study was to examine the effect of a guided imagery intervention on older adults' ADL and IADL. The results of each hypothesis are described below followed by potential explanations for the findings.

It was hypothesized that imagery would have a positive effect on older adults' physical ability for performing ADL and IADL. Given that no significant differences were found between older adults' physical ability for performing ADL and IADL from baseline to post-intervention, this hypothesis was not supported. It was also hypothesized that imagery would have a positive effect on older adults' self-efficacy for performing ADL and IADL. Again, no significant differences were found between older adults' self-efficacy for performing ADL and IADL from

baseline to post-intervention, thus resulting in no support for the hypothesis. Finally, it was hypothesized that older adults' visual and kinesthetic imagery ability would improve from baseline to post-intervention. A significant difference was found between older adults' visual imagery ability from baseline to post-intervention; however, no significant difference was found between older adults' kinesthetic imagery ability from baseline to post-intervention. As such, there was partial support for this hypothesis.

Despite the limited support for the expected outcomes of the current study, there are a number of plausible explanations for the findings. Although it was unexpected, there were no significant changes regarding a number of the dependent variables measured and this may be the result of a ceiling effect. That is, the participants' ratings on the dependent variables (i.e., physical ability for performing ADL, physical ability for performing IADL, self-efficacy for performing ADL, and self-efficacy for performing IADL) were considerably high at baseline leaving little opportunity for improvement over the course of the intervention. Put another way, our participants were relatively high functioning and mobile which likely limited the potential for improvements during the intervention. Past research implementing the OARS ADL has frequently noted that a ceiling effect is present when utilized with high functioning and independent older adults (Doble & Fisher, 1998; Haywood et al., 2004; Tullai-McGuinness & Madigan, 2009). Therefore, it is not surprising that significant differences were not found with a number of the dependent variables following the guided imagery intervention.

Furthermore, a ceiling effect likely occurred because the participants that were recruited and involved in the guided imagery intervention were high functioning, with limited or no mobility impairments. Therefore, future research should examine the effect of a guided imagery intervention on older adults that are more dependent, as they may obtain positive benefits from

utilizing imagery. For example, individuals that are not highly skilled at performing a certain task have been found to demonstrate greater advances in performing the task while utilizing imagery, compared to not utilizing imagery (Blair, Hall, & Leyshon, 1993; Driskell, Copper, & Moran, 1994; Hall, 2001). As a result, individuals that are more dependent may obtain greater benefits from utilizing imagery, such as enhanced performance of a certain task, than those who are independent with limited or no mobility impairments. Beyond this explanation, a number of methodological issues may further explain the findings of the current study.

One methodological issue pertains to the questionnaires utilized to measure participants' physical ability for performing ADL and IADL. The questionnaire may have not accurately measured participants' physical ability for performing their ADL and IADL. When calculating the alpha coefficients for the multidimensional measure of functional ability (i.e., OARS ADL; ADL and IADL), this resulted in negative numbers, which Henson (2001) recommended reporting as zeros. The negative numbers, or zeros, may have occurred due to the limited variability in participants responses (Henson, 2001). Specifically, when the variability of the individual items exceeds their shared variance, a negative number or the number zero may result, suggesting the items are not measuring what they purport to measure (Henson, 2001). As a result, the OARS ADL was most likely tapping into a variety of constructs, and therefore not adequately measuring ADL and IADL when analyzed individually. Therefore, due to the zero alpha coefficients, and following the recommendation of other researchers (i.e., Doble & Fisher, 1998; Kempen et al., 1996), the subscales of the OARS ADL were collapsed. This resulted in a unidimensional measure with different alphas ($\alpha = .35$ baseline, $\alpha = .41$ post-intervention). The alpha coefficients for the unidimesional measure in the current study are not unlike those reported in previous studies using the OARS ADL (e.g., Doble & Fisher, 1998; Whitelaw &

Liang, 1991). Despite using the unidimensional measure, further analysis revealed no significant difference from baseline to post-intervention for functional ability.

In addition to the low alpha coefficients for the OARS ADL, Njegovan et al. (2001) has suggested that the questionnaire relies on participants' perceptions regarding their ADL and IADL abilities, and not their actual ADL or IADL abilities. Furthermore, Njegovan at al. has suggested that various items on the OARS ADL may be interpreted differently by each participant. For example, a rating of "independent" may have been perceived by some as the ability to prepare full course meals, whereas others may have perceived "independent" as the ability to heat frozen meals (Njegovan et al., 2001). Further substantiating the notion that the OARS ADL may not have been measuring what is was intended to measure.

Finally, the OARS ADL may have not accurately measured participants' physical ability for performing their ADL and IADL due to the limited response items. Participants were required to select the response that most accurately described their physical capabilities for performing their ADL and IADL. A sample item from the OARS ADL reads "can you prepare your own meals." Participants had the option of selecting "without help (plan and cook full meals yourself)," with some help (can prepare some things but unable to cook full meals yourself," or "completely unable to prepare any meals" (Fillenbaum, 1996). The response items were not overly detailed regarding physical capabilities, and the limited number of response items did not provide a great deal of variety. As a result, participants may have found it difficult to select the most accurate response to represent their physical capabilities for performing their ADL and IADL. This is supported by previous researchers who have noted that the OARS ADL items were found to be poorly targeted to community-dwelling older adults (Doble & Fisher, 1998).

Although the OARS ADL has demonstrated reliability and validity in past research (e.g., Fillenbaum & Smyer, 1981; McCusker et al., 1999), the populations in previous research were different, and therefore the OARS ADL more accurately assessed that population's ADL and IADL performance (Streiner, 2003). The populations in past research were older and more dependent (McCusker et al., 1999), compared to the population utilized in the current study. As a result, the OARS ADL may not have been suitable to utilize and accurately assess older adults' physical ability for performing ADL and IADL that have limited or no mobility impairments.

A second methodological issue pertains to the self-report nature of the questionnaires. That is, the use of self-report questionnaires may have allowed for potential biases in responses (Huang, Liao, & Chang, 1998), due to the desire to appear independent (Njegovan et al., 2001). Future research should identify and implement different methods to measure participants' physical ability for performing ADL and IADL, such as physical assessments with participants or various observational measures (e.g., Geriatric Screening Questionnaire; Fernandez Buergo et al., 2002).

A third methodological issue pertains to the imagery scripts. The imagery scripts were developed by the researcher in conjunction with the participants. Participants were provided with a generic imagery script, encompassing a variety of ADL and IADL. Participants then personalized the imagery scripts by altering and providing further detail to the generic imagery scripts. However, the first issue regarding the imagery scripts relates to the number of ADL and IADL included in the imagery scripts. Although it was beneficial to incorporate a number of different ADL and IADL in the imagery scripts, it was challenging to provide enough detail and direction in the imagery scripts regarding participants' ADL and IADL within a typical day. By focusing on only one or two ADL and IADL within an imagery script, participants would have

been able to provide more detail, and therefore potentially create more vivid images (Cooley et al., 2013). Moreover, the imagery scripts were not modified over the four weeks of the imagery intervention. This may have been problematic given that participants' physical ability or self-efficacy to perform their ADL and IADL may have changed over a week or two weeks of the imagery intervention; therefore, it may have been beneficial to change the imagery scripts throughout the imagery intervention to better reflect the individual's ability to perform the tasks. Previous research has found support for changing an imagery script throughout an imagery intervention; specifically, as an individual's performance improves regarding a certain task, their imagery script should change to reflect improvements (Calmels, Holmes, Berthoumieux, & Singer, 2004; Holmes & Collins, 2001).

A fourth methodological issue pertains to the length of the guided imagery intervention. Guided imagery interventions focusing on sport and exercise, which therefore encompasses physical activity behaviours, have varied in length from three to 16 weeks (Cooley et al., 2013). Given the current intervention lasted only four weeks, this may have impacted the results because it has been recommended that the amount of imagery use participants engage in be maximized throughout an imagery intervention (Cooley et al., 2013). In addition, imagery interventions of a longer duration have been found to produce greater results than imagery interventions of a shorter duration (Cooley et al., 2013). Therefore, future research should examine if an imagery intervention of a longer duration would have had a greater influence on older adults' ADL and IADL.

Finally, a fifth methodological issue and limitation relating to the current study is the lack of a control group. The issue with only having an intervention group is that any significant findings cannot solely by attributed to the imagery intervention. That is, a number of different

factors besides the imagery intervention, such as physical practice, motivation, and environment could have impacted the findings of the current study. Unfortunately, due to the small sample size it was not realistic to implement both a control and intervention group. The small sample size was a direct representation of the challenges encountered when conducting research with older adult populations. Specifically, numerous hours were spent recruiting participants; however, only a small number of older adults were interested and willing to participate in the study. In addition, the health of older adults greatly impacts individuals' willingness to participate in research (Mody et al., 2008). For example, older adults that were interested in participating may have been incapable of participating due to poor health. Therefore, future research examining the influence of imagery on older adults' ADL and IADL should strive to obtain a larger sample size and implement both a control and intervention group.

The current study had a number of methodological issues and limitations; however, strengths of the study should be highlighted. First, the adults in this study were generally positive about the intervention and reported practicing imagery on a daily basis. Second, a significant difference was found between participants' visual imagery ability from baseline (M = 5.97) to post-intervention (M = 6.34). Participants imaged regularly (i.e., one to two times a day) throughout the imagery intervention, as indicated by the tracking sheets that were completed on a daily basis by each participant. Therefore, it was not surprising that participants' visual imagery ability improved, since imagery is a skill that can improve with practice. As a result, this finding further supports the use of imagery with older adults (e.g., Giacobbi et al., 2014; Page et al., 2001; Tunney at al., 2006). Moreover, despite only one statistically significant finding being identified from baseline to post-intervention, four out of the six means (i.e., physical ability for performing ADL, self-efficacy for performing ADL, visual imagery ability, and kinesthetic

imagery ability) increased from baseline to post-intervention. The dependent variables, physical ability for performing IADL and self-efficacy for performing IADL slightly decreased from baseline to post-intervention; however, this may have been due to the small sample size (N = 14) and a lower rating by one or two participants, thereby resulting in a decreased mean. Although the current study had a small sample size, and as a result lacked power, the findings from the current study may prove to be clinically significant. Specifically, older adults may clinically benefit from a guided imagery intervention.

A final strength of the guided imagery intervention pertains to the workshop on imagery. Nine of the participants were not knowledgeable regarding imagery or imagery scripts prior to the guided imagery intervention. Therefore, many of the participants learned what imagery was and how to utilize imagery within their daily lives. In addition, participants learned how to develop an imagery script. Previous research suggests that individuals with high imagery ability, more frequently utilize imagery to improve performance of a certain task (Gregg, Hall, & Nederhof, 2005; Vadocz, Hall, & Moritz, 1997). As a result, participants now have the knowledge and skill (i.e., improved visual imagery ability) to utilize imagery as a self-management technique or strategy to maintain or improve performance for a variety of tasks.

Despite the lack of support for the current studies hypotheses, important implications for future research studies have been identified. The current study was conducted with a small sample size; as a result, the findings from the current study cannot be generalized to the larger population. Therefore, future research studies are justified that examine the influence of imagery use on older adults' ADL and IADL with a larger sample size. Further to the small sample size and the fact that no control group was implemented, significant findings from the study cannot be solely attributed to the guided imagery intervention. As a result, it would be beneficial to

conduct a study examining the influence of imagery on older adults' ADL and IADL with both a control and intervention group. Further, the participants that were recruited for the current study were relatively healthy and functionally independent; as a result, a ceiling effect was present. Therefore, future research should examine the effect of imagery on older adults' ADL and IADL with an older and less functionally independent sample. Finally, future research studies should conduct interviews with participants following the guided imagery intervention to determine if participants perceived imagery as an effective self-management technique. In addition, interviews would allow for new categories and themes to emerge regarding older adults' openness to utilize imagery as a self-management technique. Finally, interviews may provide further detail and more in-depth information regarding older adults' use of imagery compared to the questionnaires utilized in the current study.

Taken together, the findings from the current study provide further support for the use of imagery with older adult populations. Specifically, the current study demonstrated that older adults with limited experience utilizing imagery are capable of improving their imagery ability through a guided imagery intervention. Moreover, the current study highlighted a number of important implications for future research studies examining the influence of imagery with older adults. Finally, further research is required to determine if imagery would be an effective self-management technique to implement with older adults to either maintain or potentially reduce functional disability in ADL and IADL.

References

Alexander, N. B., Galecki, A. T., Grenier, M. L., Nyquist, L. V., Hofmeyer, M. R., Grunawalt, J. C., . . . Fry-Welch, D. (2001). Task-specific resistance training to improve the ability of activities of daily living-impaired older adults to rise from a bed and from a chair. *American Geriatrics Society, 49*, 1418-1427.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

Blair, A., Hall, C., & Leyshon, G. (1993). Imagery effects on the performance of skilled and novice soccer players. *Journal of Sport Sciences, 11*, 2, 95-101.

Butler, A. J., Cazeaux, J., Fidler, A., Jansen, J., Lefkove, N., Gregg, M., . . . Wolf, S. L. (2012). The Movement Imagery Questionnaire-Revised, Second Edition (MIQ-RS) is a reliable and valid tool for evaluating imagery in stroke populations. *Evidence-Based Complementary and Alternative Medicine, 2012,* 1-11. doi: 10.1155/2012/497289

Calmels, C., Holmes, P., Berthoumieux, C., & Singer., R. N. (2004). The development of movement imagery vividness through a structured intervention in softball. *Journal of Sport Behaviour, 27*, 4, 307-322.

Cooley, S. J., Williams, S. E., Burns, V. E., & Cumming, J. (2013) Methodological variations in guided imagery interventions using movement imagery scripts in sport: A systematic review. *Journal of Imagery Research in Sport and Physical Activity, 8*(1), 1-22. doi: 10.1515/jirspa-2012-0005

Cumming, J., & Anderson, G. M. (2013). Guided imagery. In M. D. Gellman & J. R. Turner (Eds.), *Encyclopedia of behavioral medicine* (pp. 881-883). New York, NY: Springer.

Cumming, J., & Williams, S. E. (2013). Introducing the revised applied model of deliberate

imagery use for sport, dance, exercise, and rehabilitation. *Movement and Sport Sciences, 82*, 69-81. doi: 10.1051/sm/2013098

Den Ouden, M. E. M., Schuurmans, M. J., Mueller-Schotte, S., Brand, J. S., & Van Der Schouw, Y. T. (2013). Domains contributing to disability in activities of daily living. *Journal of the American Medical Directors Association, 14*, 18-24.

Doble, S. E. & Fisher, A. G. (1998). The dimensionality and validity of the older americans resources and services (OARS) activities of daily living (ADL) scale. *Journal of Outcome Measurement, 2*(1), 4-24.

Driskell, J. E., Copper, C., & Moran, A. (1994). Does mental practice enhance performance? *Journal of Applied Psychology, 79*(4), 481-492.

Fernandez Buergo, A. M., Esnaola, S., Esquisabel, R., Ricarte, F., Goicoetxea, E., Amaya Diez, A. M., & Alejandre, P. (2002). Validity and reliability of a questionnaire for screening older people for comprehensive geriatric assessment. *European Journal of General Practice, 8*(2), 50-56.

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Thousand Oaks, CA: Sage.

Fillenbaum, G. G. (2001). Activities of daily living. In G. L. Maddox (Ed.), *The encyclopedia of aging* (3rd ed., pp. 8-9) New York: Springer.

Fillenbaum, G. G. (1988; updated 1996). Multidimensional functional assessment of older adults: The Duke Older Americans Resources and Services Procedures. Hillsdale, N.J.: Erlbaum (available only from Center for the Study of Aging and Human Development, Duke University Medical Center, Durham, NC 27710).

Fillenbaum, G. G. & Smyer, M. A. (1981). The development, validity, and reliability of the

OARS multidimensional functional assessment questionnaire. *Journal of Gerontology, 36*, 428-434.

Fortinsky, R. H., Covinsky, K. E., Palmer, R. M., & Landefeld, C. S. (1999). Effects of functional status changes before and during hospitalization on nursing home admission of older adults. *Journal of Gerontology: Medical Sciences, 54A*(10), M521-M526.

Giacobbi, P. R. Jr., Buman, M. P., Dzierzewski, J., Aiken-Morgan, A. T., Roberts, B., Marsiske, . . . McCrae, C. S. (2014). Content and perceived utility of mental imagery by older adults in a peer-delivered physical activity intervention. *Journal of Applied Sport Psychology*. doi: 10.1080/10413200.2013.803502.

Gill, T. M., Baker, D. I., Gottschalk, M., Peduzzi, P. N., Allore, H., & Byers, A. (2002). A program to prevent functional decline in physically frail, elderly persons who live at home. *The New England Journal of Medicine, 347*(14), 1068-1074.

Gobbens, R. J. J. & van Assen, M. A. L. M. (2014). The prediction of ADL and IADL disability using six physical indicators of frailty: A longitudinal study in the Netherlands. *Current Gerontology and Geriatrics Research, 2014*, 1-10.

Gregg, M., Hall, C., & Butler, A. (2007). The MIQ-RS: A suitable option for examining movement imagery ability. *eCAM, 7*(2), 249-257. doi: 10.1093/ecam/nem170

Gregg, M., Hall, C., & Nederhof, E. (2005). The imagery ability, imagery use, and performance relationship. *The Sport Psychologist, 19*, 93-99.

Guralnik, J. M., Fried L. P., & Salive, M. E. (1996). Disability as a public health outcome in the aging population. *Annual Reviews of Public Health, 17*, 25-46.

Hall, C. R. (2001). Imagery in sport and exercise. In R. N. Singer, H. A.

Hausenblas, and C. M. Janelle (Eds.), *Handbook of sport psychology* (2nd ed., pp. 529-549). Wiley: New York.

Hall, C. R., Mack, D. E., Paivio, A., & Hausenblas, H. A. (1998). Imagery use by athletes: Development of the Sport Imagery Questionnaire. *International Journal of Sport Psychology*, *29*, 73-79.

Hardy, S. E. & Gill, T. M. (2004). Recovery from disability among community-dwelling older persons. *Journal of the American Medical Association, 291*(13), 1596-1602.

Haywood, K. L., Garratt, A. M., Schmidt, L. J., Mackintosh, A. E., & Fitzpatrick, R. (2004). Health status and quality of life in older people: A structured review of patient-reported health instruments. *Report from the Patient Reported Health Instruments Group,* 1-217.

Henson, R. K. (2001). Understanding internal consistency reliability estimates: A conceptual primer on coefficient alpha. *Measurement and Evaluation in Counseling and Development*, *34*, 177-189.

Holmes, P. S. & Collins, D. J. (2001). The PETTLEP approach to motor imagery: A functional equivalence model for sport psychologists. *Journal of Applied Sport Psychology, 13*, 1, 60-83.

Huang, C., Liao, H., & Chang, S. (1998). Social desirability and the clinical self-report inventory: Methodological reconsideration. *Journal of Clinical Psychology, 54*, 4, 517-528.

Kalicinski, M., & Lobinger, B. H. (2013). Benefits of motor and exercise imagery for older adults. *Journal of Imagery Research in Sport and Physical Activity*, *8*(1), 1-15. doi: 10.1515/jirspa-2012-0003

Kempen, G. I. J. M., Miedema, I., Ormel, J., & Molenaar, W. (1996). The assessment of disability with the Groningen Activity Restriction Scale: Conceptual framework and psychometric properties. *Social Science and Medicine, 43*(11), 1601-1610.

Kim, B. H. & Giacobbi, P. R. Jr. (2009). The use of exercise-related mental imagery by middle-aged adults. *Journal of Imagery Research in Sport and Physical Activity, 4*(1), 1-40. doi: 10.2202/1932-0191.1031

Lang, P. J. (1979). A bio-informational theory of emotional imagery. *The Society for Psychophysiological Research, Inc.,16*(6), 495-512.

Lawton, M. P., & Brody, E. M. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist, 9*(3), 179-186.

Lord, S. R., Castell, S., Corcoran J., Dayhew, J., Matters, B., Shan, A., & Williams, P. (2003). The effect of group exercise on physical functioning and falls in frail older people living in retirement villages: A randomized, controlled trial. *American Geriatrics Society, 51*, 1685-1692.

Luukinen, H., Lehtola, S., Jokelainen, J., Vaananen-Sainio, R., Lotovonen, S., & Koistinen, P. (2006). Prevention of disability by exercise among the elderly: A population-based, randomized, controlled trial. *Scandinavian Journal of Primary Health Care, 24*, 199-205.

Martel, L., Belanger, A., & Berthelot, J. (2002). Loss and recovery of independence among seniors. *Statistics Canada Catalogue no. 82-003, 13*(4), 35-48.

McCusker, J., Bellavance, F., Cardin, S., Belzile, E. (1999). Validity of an activities of daily living questionnaire among older patients in the emergency department. *Journal of Clinical Epidemiology, 52*, 1023-1030.

Mody, L., Miller, D. K., McGloin, J. M., Div, M., Freeman, M., Macantonio, E. R., . . . Studenski, S. (2008). Recruitment and retention of older adults in aging research. *Journal of American Geriatrics Society, 56*, 12, 2340-2348.

Mor, V., Wilcox, V., Rakowski, W., & Hiris, J. (1994). Functional transitions among the elderly: Patterns, predictors, and related hospital use. *American Journal of Public Health, 84*(8), 1274–1280.

Munnell, A. H. (2004). Population aging: It's not just the baby-boom. *An Issue in Brief: Center for Retirement Research at Boston College, 16*, 1-8.

Munroe, K. J., Giacobbi, P. R., Jr., Hall, C. R., & Weinberg, R. (2000). The four ws of imagery use: Where, when, why, and what. *The Sport Psychologist, 14*, 119-137.

Njegovan, V., Man-Son-Hing, M., Mitchell, S. L., & Molnar, F. J. (2001). The hierarchy of functional loss associated with cognitive decline in older persons. *Journal of Gerontology: Medical Sciences, 56A*(10), M638- M643.

Page, S. J., Levine, P., Sisto, S. A., & Johnston, M. V. (2001). Mental practice combined with physical practice for upper-limb motor deficits in subacute stroke. *Journal of the American Physical Therapy Association, 81*(8), 1455-1462.

Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Science, 10*(4), 22-28.

Penninx, B. W. J. H., Messier, S. P., Rejeski, W. J., Williamson, J. D., DiBari, M., Cavazzini, C., . . . Pahor, M. (2001). Physical exercise and the prevention of disability in activities of daily living in older persons with osteoarthritis. *Archives of Internal Medicine, 161*, 2309–2316.

Phelan, E. A., Williams, B., Penninx, B. W. J. H., LoGerfo, J. P., & Leveille, S. G. (2004).

Activities of daily living function and disability in older adults in a randomized trial of the health enhancement program. *Journal of Gerontology: Medical Sciences, 59A*(8), 838-843.

Saimpont, A., Malouin, F., Tousignant, B., & Jackson, P. L. (2013). Motor imagery and aging. *Journal of Motor Behavior, 45*(1), 21-28.

Statistics Canada. (2011). Generations in Canada: Age and Sex, 2011 Census (Component of Statistics Canada catalogue no. 98-311-X2011003). Retrieved from http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011003_2-eng.pdfStatistics Canada. (2013). *Canada's population estimates: Age and sex, 2013* (Component of

Statistics Canada catalogue no. 11-001-X). Retrieved from http://www.statcan.gc.ca/daily-quotidien/131125/dq131125a-eng.pdf

Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment, 80*(1), 99-103.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Allyn and Bacon.

Tullai-McGuinness, S. & Madigan, E. A. (2009). Validity testing the Outcomes and Assessments Information Set (OASIS). *Home Health Care Services, 28*(1), 45-57.

Tunney, N. M., Arnold, C. E., & Gimbel, L. M. (2011). Mental practice to facilitate learning when physical practice is unsafe: A pilot study. *Physical and Occupational Therapy in Geriatrics, 29*(3), 243-254. doi: 10.3109/02703181.2011.599481

Vadocz, E.A., Hall, C.R., & Moritz, S.E. (1997). The relationship between competitive anxiety and imagery use. *Journal of Applied Sport Psychology, 9*, 241-253.

Wakefield, C. J., & Smith, D. (2009). Impact of differing frequencies of PETTLEP imagery on netball shooting performance. *Journal of Imagery Research in Sport and Physical Activity, 4*(1), 1-12.

Wang, L., Van Belle, G., Kukull, W. B., Larson, E. B. (2002). Predictors of functional change: A longitudinal study of nondemented people aged 65 and older. *Journal of American Geriatrics Society, 50*, 1525-1534.

Wesch, N. N., Milne, M. I., Burke, S. M., & Hall, C. R. (2006). Self-efficacy and imagery use in older adult exercisers. *European Journal of Sport Science, 6*(4), 197-203. doi: 10.1080/17461390601012512

White, A., & Hardy, L. (1998). An in-depth analysis of the uses of imagery by high-level slalom canoeists and artistic gymnasts. *The Sport Psychologist, 12*, 387-403.

Whitelaw, N. A. & Liang, J. (1991). The structure of the OARS physical health measures. *Medical Care, 29*(4), 332-347.

Tables

Table 1

Frequencies

Variables	*f*
Gender	
Male	3
Female	11
Ethnicity	
White	13
Other	1
Marital Status	
Single	1
Married	5
Divorced	2
Widowed	6
Level of Education	
Secondary/High school	4
College/University	10
Used Imagery Before	
Yes	5
No	9

Table 2

Means for the Dependent Variables at Baseline and Post-Intervention

Variable	Baseline	Post-Intervention
	M (SD)	*M (SD)*
Overall physical ability (OARS ADL)	1.98 (0.04)	1.97 (0.05)
Physical ability for performing ADL	1.97 (0.06)	1.98 (0.05)
Physical ability for performing IADL	1.99 (0.04)	1.97 (0.08)
Self-efficacy for performing ADL	97.14 (6.11)	99.29 (2.67)
Self-efficacy for performing IADL	96.43 (7.45)	95.71 (8.52)
Visual imagery	5.97 (0.97)	6.34 (0.64)
Kinesthetic imagery	5.35 (1.70)	5.81 (1.17)

Note: OARS ADL= Older Americans and Resources Services Activities of Daily Living Questionnaire. ADL= Activities of Daily Living, IADL= Instrumental Activities of Daily Living. Physical Ability for performing ADL and IADL was rated on a 3-point scale ranging from 0 (*completely unable to perform the activity*) to 2 (*performs the activity without help*). Self-efficacy for performing ADL and IADL was rated on an 11-point scale ranging from 0 (*can not do*) to 100 (*certain can do*). Visual imagery was rated on a 7-point scale ranging from 1 (*very hard to see*) to 7 (*very easy to see*). Kinesthetic imagery was rated on a 7-point scale ranging from 1 (*very hard to feel*) to 7 (*very easy to feel*).

LITERATURE REVIEW

Introduction

The older adult population, persons aged 65 and over, is increasing at an accelerated rate (Statistics Canada, 2013). This is due primarily to decreased fertility and increased longevity (Munnell, 2004). In addition, the oldest of the baby-boom cohort has reached 65 years of age, thereby further contributing to the rapid increase in the number of older adults (Statistics Canada, 2011). Given that 5.3 million Canadians are aged 65 or over, it is important to determine effective self-management techniques to reduce functional disability (Statistics Canada, 2013). Specifically, reducing disability in activities of daily living (ADL) and instrumental activities of daily living (IADL) is imperative to maintaining independence. ADL are defined as basic self-maintenance tasks, which include eating, dressing, bathing, toileting, transferring into or out of a bed or chair, and getting around the house (Fillenbaum, 2001). IADL are defined as more complex tasks required for carrying out the business of daily life, which include preparing meals, shopping, managing money, doing housework, using the telephone, and taking medications (Lawton & Brody, 1969). Therefore, disability in ADL and IADL refers to the difficulty or inability to perform these activities (Phelan, Williams, Penninx, LoGerfo, & Leveilles, 2004).

As the aging population expands it is necessary to determine interventions that can improve or maintain ADL and IADL disability (Phelan et al., 2004). Imagery, which is defined as "creating or recreating images in one's mind" (Vealey & Greenleaf, 2010, p. 268), may be an effective technique to prevent, delay, or lessen ADL and IADL disability. Specifically, imagery has been shown to increase an older adult's self-efficacy in numerous tasks and situations (e.g., Giacobbi et al., 2014). Self-efficacy refers to the "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3).

Furthermore, imagery has been found to improve a person's physical ability to perform certain tasks (e.g., Page, Levine, Sisto, & Johnston, 2001; Tunney, Arnold, & Gimbel, 2011). As a result, imagery may prove to be an effective technique to use to either maintain or increase an older adult's self-efficacy or their actual physical ability to perform certain ADL and IADL.

The overall purpose of this study was to examine the effects of a guided imagery intervention on older adults' ADL and IADL. The review of literature will be divided into three parts (a) imagery, (b) self-efficacy theory, and (c) older adults' functional ability in ADL and IADL.

Imagery

The most comprehensive and readily used definition of imagery was put forth by White and Hardy (1998) in which they note imagery as:

> an experience that mimics real experience. We can be aware of "seeing" an image, feeling movements as an image, or experiencing an image of smell, tastes, or sounds without actually experiencing the real thing… It differs from dreams in that we are awake and conscious when we form an image. (p. 389)

Although imagery is a mental technique that has long been used by athletes and coaches to enhance performance (Munroe, Giacobbi, Hall, & Weinberg, 2000), it is gaining popularity in other domains including dance, exercise, and the rehabilitation setting (Cumming & Williams, 2013). It can be delivered through a variety of methods, including guided imagery scripts via phone, paper and pencil, and in person, and through audio or video recordings (Cooley, Williams, Burns, & Cumming, 2012; Vealey & Greenleaf, 2010).

Theories and Models of Imagery

A theory is defined as a "systematic arrangement of fundamental principles that provides a basis for explaining a phenomenon" (Martin, Moritz, & Hall, 1999, p. 248). Theories are important because they provide a foundation to guide the advancement and refinement of imagery research. Furthermore, different from theories, models attempt to represent a phenomenon rather than explain it (Chaplin & Krawiec, 1974). Therefore, models strengthen our understanding of the applicability of research to various situations. The following theories and models have been proposed to explain exactly why and how imagery impacts performance.

Psychoneuromuscular theory. The psychoneuromuscular theory of mental imagery, proposed by Jacobson (1931), suggests that during a vivid image identical neural patterns are activated in the brain, similar to physically performing the action. Jacobson (1932) found support for the psychoneuromuscular theory by using electromyography (EMG) and observed that during imagery minute contractions occurred only in the muscles involved in the imagined activity.

Bio-informational theory. Lang's (1979) bio-informational theory suggests that the brain's mental processing abilities are products of mental imagery. Specifically, the bio-informational theory proposes that a mental image is constructed by two distinct propositions: the stimulus proposition and the response proposition. The stimulus proposition refers to the content in the imagined situation, whereas the response proposition refers to the behavioral or emotional response experienced by the imager in the imagined situation. Therefore, mental images which include both a stimulus response and a propositional response are more effective than mental images which only include a stimulus response.

Triple-code model (ISM). The triple-code model (Ahsen, 1984) suggests images are shaped through three distinct components: the image (I), somatic response (S), and the meaning (M). The image itself, is internally produced by an individual, but possesses all the attributes of a

sensation. The individual producing the image is capable of interacting with the image similar to their interactions with the real world. As a result, the image produced can be changed to what the individual desires. The somatic response encompasses the somatic or neurophysiological change, which may involve skeletal, proprioceptive, or sensory experiences that accompany and are elicited by the image produced. The meaning of an image is interpreted by the individual based on personal experiences; therefore, no two individuals will interpret an image the same or have the same experience. Finally, the three components of the triple-code model are not always expressed in the order of image, somatic response, and meaning. The most effective images are produced when the components occur in a natural and useful order (Ahsen, 1984).

Analytic framework of imagery effects. The analytic framework of imagery effects, proposed by Paivio (1985), suggests that imagery plays both cognitive and motivational functions. Furthermore, both the cognitive and motivational functions of imagery operate at a specific and general level. The various functions of imagery represent differences in imagery content. Particularly, cognitive specific (CS) imagery represents the execution of specific skills, while cognitive general (CG) imagery involves mentally rehearsing routines or strategies related to an event. Motivational specific (MS) imagery involves imaging goal-oriented responses and motivational general (MG) imagery refers to images related to physiological or emotional arousal. The MG function of imagery was expanded upon by Hall, Mack, Paivio, and Hausenblas (1998); thus, dividing the MG function of imagery into motivational general-arousal (MG-A) imagery and motivational general-mastery (MG-M) imagery. MG-A imagery pertains to images related to the arousal and anxiety associated with competition, and MG-M imagery refers to images related to feeling confident, in control, or mentally tough.

Revised applied model of imagery use. Cumming and Williams (2013) proposed a revised applied model of imagery use, modified from the applied model of imagery use in sport (AMIUS) by Martin, Moritz, and Hall (1999). The AMIUS and the revised applied model were developed as guides to determine the function of imagery, cognitive and/or motivational, to apply in certain situations to achieve a desired outcome. Both the AMIUS and the revised applied model of imagery use encompass the five functions of imagery (CS, CG, MS, MG-A, and MG-M) proposed by Paivio (1985) and Hall et al. (1998) in the analytic framework of imagery effects. The revised applied model of imagery maintains the supported *where*, *when*, and *why* components of the original model, but incorporates recent research on imagery. Furthermore, the revised model applies to more than just athletes; it can be applied to dancers, exercisers, and rehabilitation patients.

The revised model is composed of seven components, all which contribute to a desired outcome. The *where* and *when* component impacts the function of imagery selected by an individual; moreover, *where* encompasses the location the individual is imaging. For example, middle-aged adults, 35 to 65 years of age, have been found to employ exercise-related imagery both in and out of the exercise environment (Kim & Giacobbi, 2009). Where an individual images also impacts when an individual images. For example, middle-aged adults have been found to image prior to exercise, during exercise, and/or after exercise (Kim & Giacobbi, 2009). The *who* component proposes that the individual can influence the function of imagery selected and its effectiveness. Characteristics of the individual such as gender, age, experience, and the individual's disposition or personality all may impact the function of imagery selected.

Where, *when*, and *who* are all components of the situation which lead to why an individual is imaging. *Why* pertains to the reasons an individual is imaging; for example, middle-

aged adults and older adults have been found to image to ensure proper exercise techniques are being applied, and as a result are using imagery to maintain concentration and focus while performing the exercises (Giacobbi et al., 2014; Kim & Giacobbi, 2009). The *what* and *how* component of the revised model follows the *why* component; therefore, suggesting the content may be reflective of the function, although this is not always the case. In addition, the *what* and *how* element are combined in one component because there is usually a close relationship between the two elements. *What* refers to the content being imaged (e.g., performing an exercise routine) and *how* refers to the method used to image certain content (e.g., if the individual is focusing on visual imagery, kinesthetic imagery, or a combination, and if the individual is imaging performing an exercise routine from an internal or external perspective).

The *meaning* component of the revised model is presented as a bridge between *why* (the function of imagery) and *what* (the content of an image). The personal meaning associated with an image is important for determining what content is appropriate to facilitate a certain imagery function. The model proposes that imagery will be more effective if it is meaningful to the individual. Meaningful imagery can be defined as "a match between what is being imaged and its intended function so that imagery fits both the individual and the situation" (Cumming & Williams, 2013, p. 74).

The *imagery ability* component also influences how effective an image will be in achieving a desired outcome. Imagery ability refers to one's proficiency to form controllable and vivid images (Morris, Spittle, & Watt, 2005). Imagery ability is suggested to directly influence what is imaged and how it is imaged; therefore, individuals select imagery content and strategies that are easier for them to generate and maintain.

Finally, the *outcome* component of the revised model focuses on the outcomes or goals of imagery use, which are regularly categorized as affective, behavioral, and cognitive in nature, but vary depending on the domain in which they are applied. Taken together, the revised applied model of imagery use will assist researchers and practitioners with the development of effective imagery interventions for athletes, dancers, exercisers, and individuals in the rehabilitation setting to achieve desired outcomes and goals.

Model of exercise imagery. Munroe-Chandler and Gammage (2005) developed a model of exercise imagery consisting of five components: the antecedents, the five functions of imagery, the outcomes of imagery (cognitive and behavioral), the efficacy beliefs, and the potential moderating factors. The antecedents of exercise imagery include the setting, experience, such as the length of time an individual has been exercising, an individual's goals, and an individual's concerns regarding self-presentation, such as impression motivation. The antecedents influence the imagery function selected, which includes CS, CG, MS, MG-A, and MG-M. The efficacy beliefs mediate the relationship between the functions of imagery and the behavioral and cognitive outcomes. Specifically, efficacy expectancy, outcome expectancy, outcome value, and self-presentational efficacy mediate the relationship between imagery and its outcomes. The outcomes of exercise imagery are divided into cognitive and behavioral outcomes. It has been proposed that behavioral outcomes of imagery may help an individual learn and improve skills, routines, form, and technique during exercise. Additionally, imagery may serve as a motivator for exercise behavior. It has been suggested that cognitive outcomes of exercise imagery may be a motivator in exercise dependence, may be used to regulate anxiety levels, and may impact feeling states, intention/motivation, and body image. Both the behavioral and cognitive outcomes of imagery impact the efficacy beliefs as well. Therefore, a reciprocal

relationship exists between the efficacy beliefs and the outcomes of exercise imagery. Finally, the model includes numerous moderating factors that impact how effective imagery may be as an intervention. Specifically, gender, activity type, exercise frequency, imagery ability, age, physical health status, and personality may all impact the outcomes of exercise imagery.

Conceptual frameworks of exercise imagery. Building on an earlier study conducted by Giacobbi, Hausenblas, Fallon, and Hall (2003), which examined the content and function of mental images used by female college exercisers, Kim and Giacobbi (2009) examined the content and function of mental imagery used by middle-aged adults in the exercise environment. Specifically, 30 community dwelling adults between the ages of 35 to 65 were interviewed to examine *where, when, what,* and *why* they used imagery in relation to exercise. Through grounded theory analytic procedures Kim and Giacobbi determined seven higher-order themes in exercise imagery used by middle-aged adults. Similar to Giacobbi et al. (2003), Kim and Giacobbi found participants used exercise imagery in and/or outside the exercise environment. Participants also reported using exercise imagery prior to exercise, during exercise, and throughout different times of the day (either prior, during, or after exercise). The seven high-order themes revealed through the analysis were labeled: exercise technique images, appearance images, health related images, plan/strategy images, stress level/emotion images, confidence enhancing images, and energy/drive images.

Further, Giacobbi et al. (2014) conducted a study to determine the content and perceived utility of imagery with 24 older adults (M_{age}= 65, *SD*= 8.79), 21 females and 3 males, who completed the Active Adult Mentoring Program (AAMP). The AAMP, a physical activity intervention, was instructed by peer volunteers from the community. The AAMP sessions were

digitally recorded and interviews were conducted with participants following the completion of the physical activity intervention.

Giacobbi et al. (2014) identified nine themes regarding older adults' use of imagery following the AAMP sessions, including: appearance, exercise technique, exercise self-efficacy, exercise feelings, exercise routines, exercise content, negative views, positive experiences, and dissociation. The following paragraph highlights specific findings regarding the nine themes identified following the AAMP sessions.

Regarding the nine themes identified by Giacobbi et al. (2014), images related to appearance were characterized by participants imagining themselves at a time in the past when they were thinner, able to fit into old clothes, were losing weight, and images of a hoped for physique. Images related to exercise technique involved imaging proper form on exercise equipment. The theme of exercise self-efficacy involved images related to successfully completing a workout and was associated with feelings of pride and excitement. The theme of exercise feelings included emotions associated with exercise-focused mental imagery and physical sensations. Images related to exercise routines were characterized by images of routines associated with physical activity behaviour. Images of exercise context were found to be associated with images of walking in the neighbourhood and the exercise environment. Negative views regarding imagery accounted for skepticism, resistance, and/or negative views about the use of imagery during the intervention, whereas positive views accounted for participants' enthusiasm regarding imagery use. Finally, participants further reported using imagery to dissociate pain accompanied with exercise due to various health conditions.

Measurement of Imagery Ability

Those individuals with higher imagery ability have been found to have more effective images than those with lower imagery ability (Hall, 1998). Martin et al. (1999) proposed imagery ability may moderate the effect of imagery programs; therefore, it is necessary to assess an individual's level of imagery ability because it may influence the success of an imagery program. Thus, the following measures presented assess movement imagery ability.

Vividness of Movement Imagery Questionnaire-2 (VMIQ-2). The VMIQ-2 (Roberts, Callow, Hardy, Markland, & Bringer, 2008), a modified version of the Vividness of Movement Imagery Questionnaire (VMIQ; Isaac, Marks, & Russell, 1986), is a 24 item inventory developed which assesses internal (imaging from a first-person perspective), external (imaging from a third-person perspective), and kinesthetic imagery ability (imaging the feel of a movement). Individual responses to items are rated on a 5-point Likert scale where 1= *perfectly clear and vivid* to 5= *no image at all, you only know that you are "thinking" of the skill.* Roberts et al. (2008) have demonstrated the VMIQ-2 to show factorial, concurrent, and construct validity.

Kinesthetic Visual Imagery Questionnaire (KVIQ). The KVIQ (Malouin et al., 2007) is available in a long (KVIQ-20) and short version (KVIQ-10) and was specifically developed to assess imagery ability for persons who require guidance in the rating of their imagery, and who are not able to stand or perform complex movements. Both the long and short version of the KVIQ includes subscales to assess kinesthetic and visual imagery. A 5-point Likert scale is used to rate the sensations of the image and the clarity of the image. Both versions of the KVIQ have a high level of internal consistency and accurately assess the kinesthetic and visual dimensions of motor imagery (Malouin et al., 2007). Additionally, Randhawa, Harris, and Boyd (2010) found similar results to Malouin et al. (2007) and confirmed the KVIQ to show concurrent validity. The KVIQ has been used with young (20 to 38 years), middle-aged (41 to 60 years), and older adults

(greater than 60 years) (Malouin, Richards, & Durand, 2010), as well as with persons post-stroke (Malouin et al., 2007).

Movement Imagery Questionnaire-Revised, Second Edition (MIQ-RS). Hall, Pongrac, and Buckolz (1985) developed the original Movement Imagery Questionnaire (MIQ) to measure individual differences in both visual and kinesthetic imagery of movement. The MIQ has been revised by Hall and Martin (1997) and more recently by Gregg, Hall, and Butler (2007). Hall and Martin (1997) developed the revised Movement Imagery Questionnaire (MIQ-R) which contains eight items, four assess visual imagery ability and four assess kinesthetic imagery ability. Items are rated on a 7-point Likert scale, where 1= *hard to image* and 7= *easy to image*. The MIQ-R has shown acceptable internal consistency for both the visual subscale (.84) and the kinesthetic subscale (.88) (Monsma, Short, Hall, Gregg, & Sullivan, 2009). Furthermore, the MIQ-R has demonstrated similar test-retest reliability coefficients following a one-week interval (Monsma et al., 2009).

Recently, Gregg et al. (2007) developed the Movement Imagery Questionnaire-Revised, Second Edition (MIQ-RS) which is suitable to administer to individuals with movement limitations. The functional tasks on the MIQ-RS require movements of both the upper and lower limbs, and therefore are more valid representations of individual's activities of daily living (Butler et al., 2011; Gregg et al., 2007). The MIQ-RS has been shown to be a valid and reliable measure to assess visual and kinesthetic movement imagery ability in young able-bodied individuals (Gregg et al., 2007), middle-to-older individuals (Butler et al., 2012), and stroke populations (Butler et al., 2011). It is composed of 14 items (7 visual and 7 kinesthetic) which are rated on a 7-point Likert scale ranging from 1= *very difficult to see/feel* and to 7= *very easy to see/feel*. Participants are required to read a description of a movement, perform the movement,

image that movement, and then rate their image. The MIQ-RS has been shown to have acceptable internal reliability with Cronbach's alpha coefficients of .87 for the visual subscale and .90 for the kinesthetic subscale (Gregg et al., 2007). Furthermore, the MIQ-RS has been shown to have acceptable test-retest reliability and concurrent validity (Gregg et al., 2007).

Measurement of Imagery Use

Imagery use refers to the frequency an individual utilizes imagery. It may impact the effectiveness of an imagery program; specifically, how frequently an individual utilizes imagery may positively or negatively influence their success with an imagery program. Therefore, it is important to measure imagery use because it may lead to more effective imagery training and program design. The following measures assess an individual's frequency of imagery use.

Exercise Imagery Questionnaire (EIQ). The EIQ (Hausenblas, Hall, Rodgers, & Munroe, 1999) is a 9-item inventory, which measures exercisers' use of imagery. It is composed of three subscales, including appearance imagery, technique imagery, and energy imagery. Each subscale is made up of three items that are rated on a 9-point scale, where 1= *never* and 9= *always*. The EIQ subscales have been found to have acceptable Cronbach's alphas; therefore, indicating acceptable reliability (Gammage, Hall, & Rodgers, 2000; Hausenblas et al., 1999; Wesch, Milne, Burke, & Hall, 2006). In addition, the EIQ has been utilized with older adult exercisers, 65 years of age or older (Wesch et al., 2006).

Exercise Imagery Inventory (EII). The EII, proposed by Giacobbi, Hausenblas, and Penfield (2005), is a measure of exercise imagery use. It is a 19-item inventory that assesses imagery frequency on a 7-point Likert scale, ranging from 1= *rarely* to 7= *often*. The EII consists of four subscales: appearance/health imagery, exercise technique imagery, exercise self-efficacy imagery, and exercise feelings imagery. Giaccobi et al. (2005) have demonstrated factorial and

convergent validity for the EII across three samples. Furthermore, it has been utilized by a diverse sample of individuals ranging in age from 18 to 86 years (Giacobbi et al., 2005).

Athletic Injury Imagery Questionnaire-2 (AIIQ-2). The AIIQ-2 (Sordoni, Hall, & Forwell, 2002), developed from the Athletic Imagery Injury Questionnaire (AIIQ; Sordoni, Hall, & Forwell, 2000), assesses athletes' use of imagery during injury rehabilitation. The AIIQ-2 is a 12 item inventory, consisting of three subscales: cognitive imagery, motivational imagery, and healing imagery. All subscales of the AIIQ-2 are assessed by four items, which are rated on a 9-point Likert scale, ranging from 1= *never use imagery* to 9= *always use imagery*. The psychometric properties of the AIIQ-2 have been found to be adequate (Sordoni et al., 2002).

Imagery Scripts

Imagery can be implemented through a variety of methods including guided imagery scripts, audio tapes, and video recordings (Vealey & Greenleaf, 2010). However, one of the most widespread methods of delivering imagery is through the use of guided imagery scripts, which provides a structured method of implementing imagery (Cooley et al., 2013). Imagery scripts are "pre-planned descriptions of complete imagery scenarios, developed with the desired outcome of the imagery use in mind" (Cooley et al., 2013, p. 2). By using imagery scripts to guide imagery, individuals are able to develop more vivid images and the imagery scripts help ensure that the correct imagery is being used to achieve the desired outcome (Cumming & Anderson, 2013). Additionally, imagery scripts can describe an "ideal" quality of image an individual aspires to develop through continual reexamination and repeated practice (Cooley et al., 2013). Moreover, personalized imagery scripts have been found to be more effective than generic imagery scripts; therefore, effective guided imagery interventions should include detailed and personalized imagery scripts (Cooley et al., 2013).

Imagery Affecting Outcomes

The context in which imagery has been examined is broad and the extent of imagery research is vast. The effects of imagery programs have been examined among numerous outcome variables; however, key outcome variables examined within imagery research include learning and performance, self-confidence and/or efficacy, and anxiety (Munroe-Chandler & Morris, 2011).

The effects of imagery use on learning and performance have been examined in various domains, such as sport, exercise, and rehabilitation. Within the sport domain, imagery has been found to enhance learning and performance of a sport skill (Munroe et al., 2000). Beauchamp, Bray, and Albinson (2002) found golfers that frequently employed MG-M imagery prior to competition, performed better than golfers who employed MG-M imagery less frequently prior to competition. In addition, imagery has been utilized by athletes to enhance the development and execution of game plans, strategies of play, and routines (Munroe et al., 2000). Specifically, imagery has been utilized for rehearsing American football plays (Fenker & Lambiotte, 1987) and youth soccer strategies (Munroe-Chandler, Hall, Fishburne, & Shannon, 2005). Within the exercise domain, imagery has been found to be utilized by exercisers to improve exercise technique and to plan exercise routines (Giacobbi et al., 2003; Giacobbi et al., 2014; Kim & Giacobbi, 2009). Finally, within the rehabilitation domain imagery has been found to enhance the relearning of certain tasks after a stroke (Malouin & Richards, 2010; Page et al., 2001).

Imagery has further been utilized to increase confidence and efficacy in a number of different situations. Particularly in sport, employing MG-M imagery has been found to increase and stabilize elite adult badminton players sport confidence (Callow, Hardy, & Hall, 2001). Vadocz, Hall, and Moritz (1997) found that motivational imagery was associated with

competitive state anxiety and self-confidence in elite roller skaters. Specifically, elite roller skaters that utilized more MG-M imagery were found to be more confident. Furthermore, athletes that are high in sport confidence or self-efficacy have been found to employ MG-M imagery more frequently (Moritz, Hall, Martin, & Vadocz, 1996); therefore, supporting the relationship between imagery and confidence or efficacy. In the exercise domain, imagery has been found to be employed by exercisers to enhance self-efficacy for performing specific exercises and to enhance self-efficacy for engaging in exercise behavior (Giacobbi et al., 2003; Giacobbi et al., 2014; Kim & Giacobbi, 2009).

Lastly, the effects of imagery on anxiety have been examined within sport. Imagery has been found to reduce anxiety; specifically, Carter and Kelly (1997) found imagery reduced somatic state anxiety in athletes completing a basketball free-throw shot. In addition, Page, Sime, and Nordell (1999) found that positive imagery reduced pre-competitive anxiety in female swimmers. Not only has imagery been found to reduce anxiety, but imagery has further been found to increase arousal levels (White & Hardy, 1998). Within the exercise domain, imagery has further been found to be utilized by exercisers to reduce stress (Giacobbi et al., 2003; Kim & Giacobbi, 2009)

The findings from this section support the use of imagery to obtain a variety of outcome variables. As a result, older adults may be able to utilize imagery to prevent or reduce functional disability in ADL and IADL. Specifically, older adults may be able to employ imagery to increase their self-efficacy for performing certain ADL and IADL. Additionally, imagery use has been found to be associated with reducing anxiety; therefore, if older adults happen to be anxious while performing certain ADL and IADL, they may be able to utilize imagery to reduce their

anxiety. The following sections within this review highlight the effects of imagery on outcome variables specifically involving the older adult population.

Imagery Use and Ability in Older Adults

Numerous studies have examined varying dimensions of imagery by older adults. Specifically, three aspects of imagery have been regularly examined in older adults: the vividness of images, the accuracy of images, and the temporal characteristics of images (Saimpont, Malouin, Tousignant, & Jackson, 2013). The following section will highlight findings from studies examining the aforementioned aspects of imagery, as well as older adults' use and acceptability of imagery.

Vividness of imagery. The vividness of an image refers to the clarity or the intensity of sensations perceived by an individual during the creation or recreation of an image (Saimpont et al., 2013). An individual is capable of imaging from a first-person (internal) or a third-person (external) perspective. An image from the first-person perspective includes kinesthetic sensations and visual representations of an action as if an individual were actually performing it (Saimpont et al., 2013). An image from the third-person perspective includes visual representations of an action; as if an individual were observing themselves perform the action or someone else perform the action (Saimpont et al., 2013).

Older adults are capable of forming images as vivid as younger adults (Saimpont et al., 2013). However, older adults' use of imagery from the first-person perspective has been shown to decline with increasing age (Malouin et al., 2010; Mulder, Hochstenbach, Heuvelen, & Den Otter, 2007). One suggestion for this decline may be due to the fact that older adults may spend more time watching others move than moving themselves (Malouin et al., 2010). Although an age-related decline has been found in the vividness of images with older adults regarding

imaging from the first-person perspective, further research is required to examine older adults' capability of developing vivid images.

Accuracy of imagery. Older adults are capable of developing accurate images, and their ability to image accurately remains well preserved with increasing age (Saimpont et al., 2013). More specifically, older adults are highly capable of developing accurate images for upper-limb movements (Devlin & Wilson, 2010; Saimpont, Pozzo, & Papaxanthis, 2009). However, the accuracy of an older adult's image may be affected if the upper-limb movements include biomechanical constraints (Saimpont et al., 2009) or require peripersonal (outside arms reach) space limitations (Gabbard, Cacola, & Cordova, 2011). Furthermore, the accuracy of an older adult's image may be affected by a complex movement involving sequences of the whole body (Saimpont, Mourey, Manckoundia, Pfitzenmeyer, & Pozzo, 2010). Further research is required to determine the accuracy of images developed by older adults.

Temporal characteristics of imagery. It generally takes a comparable amount of time for an individual to image a movement as it does for them to actually perform the movement; this is because similar central processes are involved (Saimpont et al., 2013). The latter has been referred to as the temporal congruence between imagery and movement execution. Older adults who perform simple and regular movements have been found to be highly capable of reproducing the temporal characteristics of the movements during an image (Saimpont et al., 2013). However, an older adult may have difficulty reproducing the temporal characteristics of more complex and constrained movements (Saimpont et al., 2013).

Older adults' use and acceptability of imagery. As previously stated Giacobbi et al. (2014) conducted a study to determine the content and perceived utility of mental imagery with older adults who completed the AAMP. The AAMP sessions and specifically the interviews

provided valuable insights into the acceptability, openness, and/or resistance towards the use of imagery by older adults.

Analysis of the interviews revealed four themes: positive experiences using imagery, negative views regarding imagery, previous imagery experiences, and comments about mentors. The results revealed that 13 participants perceived imagery as a helpful aspect of the intervention and would continue using imagery, whereas nine participants did not view imagery as a helpful skill and thus would not continue using imagery. Older adults that were skeptical regarding the use and benefits of imagery reported having limited experiences with imagery, and further suggested that mentors may have not explained imagery clearly or strongly justified the use and benefits of imagery. Given the number of adults who did not perceive imagery as beneficial, further examination of older adults' openness and acceptability regarding imagery is warranted. Additionally, Giacobbi et al. (2014) suggested it would be beneficial to examine older adults' views regarding imagery prior to interventions.

Overall, imagery was found to be an effective method to increase and maintain physical activity behavior with older adults that were open and accepting to the use of mental imagery. Moreover, due to the reasons reported by older adults that were less enthusiastic or skeptical regarding the use of mental imagery, further investigation is warranted to determine the benefits, acceptability, openness, and/or skepticism regarding older adults use of mental imagery. As a result, it would be beneficial to examine different forms of physical activity behavior with older adults, particularly ADL and IADL, since older adults normally engage in ADL and IADL on a regular basis and may value maintaining their ADL and IADL more than physical activity behavior, due to a desire to maintain independence.

Imagery Interventions Designed to Improve Functional Performance

As highlighted in previous sections of this review, imagery has been found to increase and enhance physical activity behavior in older adults (Giacobbi et al., 2014). Specifically, older adults that are open and willing to use imagery have been found to use imagery for a variety of reasons, including: appearance, exercise technique, exercise self-efficacy, exercise feelings, exercise routines, exercise context, and dissociation (Giacobbi et al., 2014). Furthermore, imagery has been found to increase older adults' self-efficacy for physical activity behavior (Giacobbi et al., 2013). If self-efficacy is enhanced for physical activity behavior, individuals may be more likely to participate in physical activity (Cumming, 2008). As a result, due to the previously stated findings, implications exist to examine the impact of imagery on all forms of physical activity behavior, including ADL and IADL (Giacobbi et al., 2014). Imagery may be an effective tool for older adults to use in order to maintain functional performance in ADL and IADL. Specifically, imagery may increase older adults' self-efficacy for performing ADL and IADL, which in turn may increase their ability to perform ADL and IADL.

Varying studies have examined the use of imagery to assist with relearning or learning of specific tasks. Specifically, imagery has been used as a tool to enhance the relearning of certain tasks after a stroke (Malouin & Richards, 2010; Page et al., 2001). Additionally, repeatedly visualizing a task has been found to improve an individual's ability for performing the task; however, imagery combined with physical practice has been found to be more effective than imagery alone (Malouin & Richards, 2010; Page et al., 2001).

A case study conducted by Page et al. (2001), examined an individual's progression through a program combining physical therapy with mental imagery to improve upper limb function affected by a stroke. The participant was a 56 year old man, who received physical therapy for an hour, three times a week, for a period of six weeks. In addition, the participant

listened to an audiotape two times a week at the physical therapy sessions, as well as two times a week at home, instructing him to visualize functionally using the affected limb. Results of the study suggested that mental imagery may complement physical therapy to improve functional performance post-stroke.

Similarly, a study conducted by Tamir, Dickstein, and Huberman (2007) compared group therapy sessions employing only physical therapy with group therapy sessions combining both physical therapy and mental practice. A total of 23 participants with Parkinson's disease were recruited, 11 participants received only the physical therapy, whereas 12 participants received the combined therapy. Results revealed that both groups improved, but participants in the group therapy session combining both physical therapy and mental practice were significantly faster at performing movement sequences. As a result, the combination of both physical and mental practice would be beneficial to examine further in a variety of populations to improve functional performance.

Additionally, imagery has been used as a tool to facilitate learning of a novel task. Specifically, Tunney, Arnold, and Gimbel (2011) conducted a study with three community-dwelling older adults to determine if they were capable of learning a floor-to-chair transfer with imagery. Two participants were female and were 85 and 89 years of age and one participant was a 76 year old male. Participants completed one session of physical practice of the floor-to-chair transfer and received training in mental imagery; furthermore, they received a six week home exercise program for mental imagery. Following the completion of the six week intervention, all three participants indicated that the home exercise program for mental imagery had a positive impact on their performance of the floor-to-chair transfer. Furthermore, all three participants

maintained or improved their performance of the floor-to-chair transfer after six weeks following the completion of the home exercise program for mental imagery.

Given the previous findings and support for imagery as an effective method of enhancing and increasing functional performance in a variety of tasks and situations (e.g., Page et al., 2001; Tamir et al., 2007; Tunney et al., 2011), it would seem fitting to examine older adults' use of imagery and the effect it may have on their self-efficacy and physical ability to perform ADL and IADL. Imagery may be a safe and cost-effective self-management tool for older adults to use to potentially maintain their independence; therefore further research is warranted.

Self-efficacy Theory

Self-efficacy is an important construct of the social cognitive theory (SCT). Bandura (1997) proposed the SCT which describes factors that affect and determine behavior. SCT assumes people are actively involved in their own development through an interplay of personal, behavioral, and environmental influences with motivation as the outcome. Bandura suggested that how a person interprets their behavior informs and alters their environments and the personal factors they possess, which in turn informs and alters subsequent behaviors. There are seven main constructs embedded within the SCT: observational learning, goals, outcome expectations, outcome expectancies, self-regulation, behavioral outcomes, and self-efficacy (Bandura, 1997). For the purpose of the current proposal, the focus will be on the construct of self-efficacy.

The theory of self-efficacy is concerned primarily with the role of personal factors in the reciprocal triadic model of the SCT (Bandura, 1997). Self-efficacy beliefs serve as the foundation for human motivation, well-being, and personal accomplishment. Bandura (1997) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). It is a situation-specific form of self-

confidence that focuses on the extent to which an individual feels he or she will be successful in producing a specific outcome given their skills and the situation. Bandura further proposed that self-efficacy beliefs are constructed from four sources of information: mastery experiences, vicarious experiences, social persuasion, and physiological and affective states.

Sources of Self-efficacy

Mastery experiences. Mastery experiences refer to an individual's actual past performance or a cognitive reconstruction of a past performance and how they interpreted or perceived that performance (Bandura, 1997). Mastery experiences are the most influential source of efficacy information because it provides an individual with tangible indicators of their capability (Bandura, 1997). Performances interpreted as successful generally increase an individual's self-efficacy, whereas performances interpreted as failures generally decrease an individual's self-efficacy. An example of a mastery experience would be if an older adult performed an IADL or visualized performing an IADL, such as using the telephone successfully, then their self-efficacy for using the telephone would increase.

Vicarious experiences. An individual's self-efficacy may be influenced by vicarious experiences, particularly by modeling or comparing with the successes and failures of others (Bandura, 1997). Additionally, vicarious experiences relate to mental imagery; specifically, by imaging oneself, or someone similar, perform a certain task (Bandura, 1986). If an individual observes or imagines a similar person succeed it may raise their self-efficacy and motivate them to attempt the task, whereas if an individual observes or imagines a similar person fail it may lower their self-efficacy resulting in the individual believing they do not possess the necessary capabilities to succeed (Bandura, 1986). Therefore, modeling or imagining attainments of oneself or similar others may greatly influence an individual's self-efficacy. An example of a vicarious

experience would be if an older adult observed or imagined an individual of similar age and ability performing an ADL, such as putting their coat and shoes on successfully, it may increase their self-efficacy and motivate them to attempt the task.

Verbal persuasion. Social persuasion serves as a method of developing self-efficacy. Specifically, if a persuader expresses belief or doubt in an individual's capabilities it may raise or lower their self-efficacy (Bandura, 1997). Individuals will be influenced by persuaders more if they have a reason to believe that their actions will produce desired outcomes. Furthermore, the extent to which an individual perceives the persuader as trustworthy and credible will influence the effectiveness of the persuader (Bandura, 1997). Verbal persuasion is limited regarding the influence it has on an individual's self efficacy; although, through feedback and communication with a persuader, an individual may produce images related to a task or behavior which may influence their self-efficacy beliefs. An example may include an older adult's significant other telling them that they are capable of cooking a healthy and delicious meal; therefore, increasing an individual's self-efficacy for preparing and cooking a meal.

Physiological and affective states. Physiological and affective states, such as stress and anxiety, can influence an individual's self-efficacy beliefs prior to completing a task (Bandura, 1997). If somatic indicators are experienced by an individual and they are perceived as negative, self-efficacy will likely decrease (Bandura, 1997). Furthermore, a negative emotional state may decrease an individual's self-efficacy and result in further doubt regarding their capability of performing a task. To develop self-efficacy, it would be beneficial for an individual to improve physical and emotional well-being and to reduce negative thoughts (Bandura, 1997). For example, an older adult believes they are strong and therefore are capable of performing a

transfer from a chair by themselves. Possessing positive thoughts and feeling confident regarding their physical capabilities increases their self-efficacy for performing the transfer.

Measurement of Self-efficacy

Numerous scales have been developed to measure an individual's self-efficacy beliefs for specific tasks. However, when measuring self-efficacy "efficacy beliefs should be measured in terms of particularized judgments of capability that may vary across realms of activity, under different levels of task demands within a given activity domain, and under different situational circumstances" (Bandura, 1997, p. 42). Furthermore, the standard method of measuring self-efficacy is on a 100-point scale (Bandura, 1997). Scales generally range in 10-unit intervals where 0= *can not do*, 50= *moderately certain can do*, to 100= *certain can do*.

Self-efficacy Theory Based Interventions with Older Adults

In a study conducted by Giacobbi et al. (2014), which examined the content and perceived utility of imagery with older adults, self-efficacy beliefs were supported by participants that perceived imagery to be beneficial. Participants' responses during the physical activity intervention supported vicarious experiences as a source of self-efficacy; specifically, participants discussed re-experiencing satisfying exercise experiences during the physical activity intervention sessions. The findings by Giacobbi et al. (2013) are further supported by a previous study conducted by Wesch et al. (2006).

Specifically, Wesch et al. (2006) conducted a study to investigate the relationships between the three types of self-efficacy (i.e., task, barrier, and scheduling) and mental imagery with older adult exercisers aged 65 years and over. Results revealed that older adult exercisers used appearance and technique imagery significantly more than energy imagery. Moreover, energy imagery significantly predicted task self-efficacy; however, none of the three functions of

imagery predicted barrier or scheduling self-efficacy. Therefore, the findings from the previously discussed studies provide support for the use of imagery to enhance exercise self-efficacy, thus suggesting imagery may be a beneficial tool for older adults to use to enhance self-efficacy for certain ADL and/or IADL.

In a study conducted by Lee, Avis, and Arthur (2007), the role of self-efficacy regarding the development and maintenance of a walking program with Taiwanese adults 60 years of age or older was examined. Participants (N = 22) took part in a six month community-based walking intervention which used the self-efficacy theory to enhance confidence in regular walking as exercise. Participants were interviewed following the completion of the intervention and reported they were motivated to maintain walking through peers' successful experiences in regular walking, and by experiencing positive physiological and psychological responses to walking. Thus, participants' responses supported the use of the self-efficacy theory through sources of self-efficacy, such as vicarious experiences and physiological and affective states, to initiate and maintain a walking program.

Hellstrom, Lindmark, Wahlburg, and Fugl-Meyer (2003) conducted a study examining self-efficacy in terms of falls-efficacy with 37 participants, aged 66 to 89 years of age, completing a rehabilitation program post-stroke. Participants completed measures assessing their falls-efficacy, balance, and functional independence. Participants improved on all three measures; however, participants with higher levels of self-efficacy at the completion of the rehabilitation program showed more pronounced improvements than those with less self-efficacy. Furthermore, the falls-efficacy measure was found to be a predictor of participants' activities of daily living. Therefore, findings from this study support the use of self-efficacy enhancement to minimize dependence in ADL.

Due to the findings previously presented, using the self-efficacy theory as a theoretical base with imagery to enhance performing ADL and IADL would be a practical application. Particularly, the sources of self-efficacy may be targeted through visual or kinesthetic imagery and from either an internal or external perspective; therefore, if individuals' self-efficacy for performing ADL and/or IADL can be increased through imagery, it may be found to be a safe and cost effective self-management tool to assist in maintaining older adults' independence.

Older Adults' Functional Ability in ADL and IADL

Age is strongly associated with the onset of chronic conditions, activity limitations, disabilities, and institutionalization (Den Ouden, Schuurmans, Mueller-Schotte, Brand, & Van Der Schouw, 2013; Martel et al., 2002). Particularly, functional decline is one of the greatest threats to independency in older adults (Den Ouden et al., 2013). Functional decline can progress into functional limitations and eventually lead to disability in ADL and IADL (Wang, Van Belle, Kukull, & Larson, 2002). ADL are defined as basic self-maintenance tasks, which include eating, dressing, bathing, toileting, transferring into or out of a bed or chair, and getting around the house (Fillenbaum, 2001). IADL are defined as more complex tasks required for carrying out the business of daily life, which include preparing meals, shopping, managing money, doing housework, using the telephone, and taking medications (Lawton & Brody, 1969). Disability in ADL and IADL refers to the difficulty or inability to perform these activities (Phelan et al., 2004).

Disability generally occurs in IADL, the more complex tasks required for carrying out the business of daily life, prior to developing disability in ADL (Fillenbaum, 2001). Disability in ADL and IADL is a dynamic process; that is, older adults both develop disability and are able to recover from a period of disability (Hardy & Gill, 2004; Martel et al., 2002). Furthermore,

multiple factors contribute to disability in ADL and IADL; particularly, a variety of demographic, health, lifestyle, and socio-economic characteristics impact independence in older adults (Martel et al., 2002). Due to the growth in the older adult population, it is imperative to determine effective self-management techniques to prevent, delay, or reduce ADL and IADL disability in older adults, and imagery may be one means of doing so.

Factors Associated with Functional Ability in ADL and IADL

Age. A personal factor that has been found to be associated with functional ability in ADL and IADL is age; specifically, for both males and females the likelihood of becoming dependent in ADL and IADL increases with age (e.g., Den Ouden et al., 2013; Martel et al., 2002; Millan-Calenti et al., 2010). Furthermore, the probability of regaining independence in ADL and IADL ability after it is lost decreases with age (Gill, Robinson, & Tinetti, 1997; Martel et al., 2002). Numerous studies have found that once older adults reach 85 years of age or older the odds of recovering independence in ADL and IADL after a period of dependence significantly decreases (Gill et al., 1997; Martel et al., 2002).

Gender. A personal factor that has been found to be associated with independence, that is the ability to perform ADL and IADL, is gender (e.g., Den Ouden et al., 2013; Millan-Calenti et al., 2010). It has been found that older men are less likely to become dependent than older women (e.g., Den Ouden et al., 2013; Millan-Calenti et al., 2010). This generally occurs because women live longer than men and are more likely to age into disability (Alexandre et al., 2012). Furthermore, it has been found that older men are more likely to regain independence following a period of dependency compared to older women (Martel et al., 2002).

Frailty. Frailty, which is considered a pre-disability, predicts and further contributes to functional disabilities in older adults (Gobbens & van Assen, 2014). Frailty is defined as “a

dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, and social) which is caused by the influence of a range of variables and which increases the risk of adverse outcomes" (Gobbens, Luijkx, Wijnen-Sponselee, & Schols, 2010, p. 342). Physical frailty has been found to have the strongest association to functional disability (Gobbens & van Assen, 2014; Gobbens, van Assen, Luijkx, & Schols, 2012).

Lifestyle characteristics. Numerous lifestyle characteristics have been found to contribute to functional ability in ADL and IADL. One lifestyle characteristic that has been found to contribute to functional decline in ADL and IADL is a lack of physical activity. Specifically, studies have found that older adults are more likely to maintain their independence and recover from a period of dependence if they are physically active compared to inactive (e.g., Avilia-Funes et al., 2011; Den Ouden et al., 2013). Avilia-Funes et al. (2011) suggested physical activity is an important target for disability prevention.

Another lifestyle characteristic that has been found to be associated with functional decline in ADL and IADL is smoking (e.g., Den Ouden et al., 2013; Wang et al., 2002). Older adults who were former smokers and who still currently smoke are at a greater risk of functional decline in ADL and IADL (Struck et al., 1999).

Various studies have examined the association between alcohol consumption and functional ability in ADL and IADL. Small to moderate amounts of alcohol consumption have not been found to contribute to the loss of independence in older adults (Martel et al., 2002; Stuck et al., 1999; Wang et al., 2002). Surprisingly, older adults who consume small to moderate amounts of alcohol have been found to maintain their mobility more than older adults who do not consume any alcohol (Stuck et al., 1999). The authors suggest this finding may be due to the fact

that small to moderate amounts of alcohol consumption have been associated with decreased risk of cardiovascular events.

Lastly, an individual's living arrangements have been found to be associated with functional ability in ADL and IADL. Specifically, living arrangements have been found to impact an older adult's recovery of ADL and IADL after a period of dependency. Older adults, who live alone, have been found to recover from periods of dependency more often than older adults whom live with a significant other (Martel et al., 2002; Wang et al., 2002). A possible explanation for this finding is that older adults who live alone have more opportunities to perform ADL or IADL; therefore, helping maintain the ability to perform them (Wang et al., 2002).

Physical and mental health. Numerous studies have found chronic conditions to have a strong association between both the loss and recovery of ADL and IADL (e.g., Den Ouden et al., 2013; Martel et al., 2002; Wang et al., 2002). The type and number of chronic conditions an older adult possesses have been found to greatly impact functional ability in ADL and IADL (e.g., Den Ouden et al., 2013; Martel et al., 2002).

Depression and the symptoms associated with depression have also been found to impact ADL and IADL performance. Specifically, the symptoms associated with depression have been found to negatively impact both males and females functional ability in both ADL and IADL (e.g., Alexandre et al., 2012; Den Ouden et al., 2013). An explanation for this finding may be that symptoms of depression, for example fatigue, may affect an older adult's physical capability, as well as the effort necessary to maintain functional ability and the willingness to perform tasks, such as ADL and IADL (Stuck et al., 1999).

Finally, the day-to-day function of older adults is strongly associated with cognitive ability. Low cognitive ability has been shown to be associated with poor physical functioning; therefore, a difficulty or inability to perform ADL and IADL (e.g., Stuck et al., 1999; Wang et al., 2002). In a study conducted by Avilia-Funes et al. (2011) it was found that older adults with low cognitive ability had greater difficulty performing both ADL and IADL. Furthermore, low cognitive ability was found to be strongly associated with older adults' ability to perform IADL. This finding was attributed to IADL being more complex; thus, tasks such as preparing meals, shopping, managing money, doing housework, using the telephone, and taking medications depend more on the integrity of an older adult's cognitive ability (Avilia-Funes et al., 2011).

Measurement of ADL and IADL Ability

As individuals age, numerous factors may contribute to a decline in the ability to perform tasks necessary to live independently in the community. Therefore, instruments that assess functional status are essential to indicate either decline or improvement regarding an individual's health status. Measures of functional status provide objective data which assists in targeting an individual's potential needs for rehabilitation or assisted living services. As a result, a number of different measures have been developed to assess functional ability in ADL and IADL independence.

Katz Index of Independence in Activities of Daily Living (Katz ADL). The Katz ADL index (Katz, Ford, Muskowitz, Jackson, & Jaffe, 1963) assesses an individual's ability to perform basic ADL independently. The Katz ADL index consists of six items which include the functions of: bathing, dressing, toileting, transferring, continence, and feeding. Individual's rank each item either a one or zero, where 1= *no supervision, direction, or personal assistance* required to perform the function and 0= *with supervision, direction, personal assistance, or total*

care required to perform the function. Participants' responses are scored, a score of 6= *full function*, 4= *moderate impairment*, and 2 or less= *severe functional impairment*. The Katz ADL index is used as a flag to identify functional capabilities of older adults in clinical and home settings; as a result, there are limited formal assessments determining the reliability and validity of the index (Shelkey &Wallace, 2012).

Lawton Instrumental Activities of Daily Living Scale (Lawton IADL Scale). The Lawton IADL scale (Lawton & Brody, 1969) assesses an individual's ability to perform the more complex skills required to live independently. The Lawton IADL scale consists of eight items which include ability to use the telephone, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility for own medications, and ability to handle finances. Participants are required to circle and select the item description that most closely resembles their highest level of functioning, either a zero or a one. A summary score is calculated from participants' responses, the summary score ranges from zero indicating low function and dependence to eight indicating high function and independence. Lawton and Brody (1969) found the Lawton IADL scale to have high inter-rater reliability. In addition, they found support for the validity of the Lawton IADL scale by determining the correlations of the Lawton IADL with four scales that measured domains of functional status. All the correlations computed between the Lawton IADL and the four different scales assessing functional status were found to be significant at the 0.01 or 0.05 level.

Older Americans' Resources and Services Activities of Daily Living Questionnaire (OARS ADL). The OARS ADL questionnaire (Fillenbaum, 1996) assesses both ADL and IADL important for independent living in the community. The OARS ADL questionnaire consists of 14 items, seven items assess ADL and seven items assess IADL. Each item is rated on a 3 point

scale: *performs the activity without help* (2), *performs the activity with some help* (1), *completely unable to perform the activity* (0), or not answered (-).The OARS ADL takes 10-15 minutes to complete. A study conducted by Fillenbaum and Smyer (1981) found the OARS ADL to have high inter-rater reliability. In addition, McCusker, Bellavance, Cardin, and Belzile (1999) have found the OARS ADL to show construct validity.

Interventions Designed to Improve Functional Ability in ADL and IADL

As the aging population expands, it is necessary to determine interventions that can prevent, delay, or lessen ADL and IADL disability (Phelan et al., 2004); particularly, because disability has been found to be associated with the use of formal and informal home services (Penninx et al., 2001), admission to a nursing home (Fortinsky, Covinsky, Palmer, & Landefeld, 1999), and hospitalization (Mor, Wilcox, Rakowski, & Hiris, 1994). A number of interventions have been designed and implemented with the focus on preventing functional disability in ADL and IADL or restoring functional ability in ADL and IADL. Moreover, many of the current intervention designs implemented involve the use of exercise (e.g., Alexander et al., 2001; Gill et al., 2002; Lord et al., 2003; Luukinen et al., 2006).

Specifically, Gill at al. (2002) conducted a trial of a six month, home-based program designed to prevent functional decline in ADL of older adults who lived at home. Participants (N=188) were 75 years of age or older and were randomly assigned to a control or intervention group. Participants that were assigned to the control group completed an educational program, whereas participants assigned to the intervention group completed physical therapy that focused on improving impairments in physical abilities, including balance, muscle strength, ability to transfer from one position to another, and mobility. Findings supported the use of a home-based program designed to target underlying impairments in physical abilities. Specifically,

participants in the intervention group had less functional decline over time compared to participants in the control group. In addition, more benefits from the home-based program were observed with those participants classified with moderate frailty rather than severe frailty. A similar study that supported Gill et al.'s (2002) findings, conducted by Luukinen et al. (2006), involved the planning and implementation of an intervention with older adults 85 years of age or older. The intervention consisted of home exercise, walking exercise, group exercise, and self-care exercise. Luukinen et al. found the intervention slowed down the reduction of mobility performance in participants and participants balance improved; however, no positive effects were found in participants with severe movement disability and any dysfunction in ADL.

Lord et al. (2003) examined the effect of group exercise on physical functioning and falls in older adults living in retirement villages. Participants ranged in age from 62 to 95 years, and were randomly assigned to either the intervention group, a weight-bearing group exercise, or the control group, where participants had the option of attending flexibility and relaxation classes. Lord et al. found that the weight-bearing group exercise intervention could prevent falls and maintain physical functioning in older adults. Furthermore, Alexander et al. (2001) designed an intervention to improve the ability of older adults to rise from a bed and from a chair. Participants were randomly assigned to the intervention group, which involved completing a 12-week task-specific resistance-training intervention. Participants that completed the 12-week task-specific resistance-training intervention were found to have increased their overall ability, and decreased their rise time required to perform a series of bed and chair rise tasks.

Phelan et al. (2004) conducted a community-based preventative health program designed to improve function in older adults with ADL disability. Participants were 70 years of age or older and were randomly assigned to a control or intervention group. Participants assigned to the

intervention group were encouraged to attend any or all of three core offerings: an evidence-based exercise class, chronic disease self-management classes, and/or pairing with a trained volunteer senior for peer support (health mentor). Findings from the study support the use of the Health Enhancement Program intervention to improve ADL functioning in older adults who initially had an ADL disability. Therefore, the use of the Health Enhancement Program offered a promising strategy for limiting or reversing functional decline in older adults with an ADL disability.

Preventing or reducing functional disability in older adults has been identified as a critical health issue (Guralnik, Fried, & Sallive, 1996); therefore, more strategies are needed to prevent or reduce ADL and IADL disability in older adults (Penninx et al., 2001). The aforementioned studies provide support for the implementation of interventions aimed at preventing or reducing functional decline in older adults; however, not all older adults may be capable of performing the physical activity behaviours required of the experimental groups due to mobility impairments; therefore, further research is warranted to determine effective interventions to implement to reduce functional disability in older adults with or without mobility impairments.

References

Ahsen, A. (1984). ISM: The triple code model for imagery and psychophysiology. *Journal of Mental Imagery, 8*(4), 15-42.

Alexander, N. B., Galecki, A. T., Grenier, M. L., Nyquist, L. V., Hofmeyer, M. R., Grunawalt, J. C., . . . Fry-Welch, D. (2001). Task-specific resistance training to improve the ability of activities of daily living-impaired older adults to rise from a bed and from a chair. *American Geriatrics Society, 49*, 1418-1427.

Alexandre, T. S., Corona, L. P., Nunes, D. P., Santos, J. L. F., Duarte, Y. A. O., & Lebrao, M. L. (2012). Gender differences in incidence and determinants of disability in activities of daily living among elderly individuals: SABE study. *Archives of Gerontology and Geriatrics, 55*, 431-437.

Avilia-Funes, J. A., Pina-Escudero, S. D., Aguilar-Navarro, S., Gutierrez-Robledo, L. M., Ruiz-Arregui, L., & Amieva, H. (2011). Cognitive Impairment and low physical activity are the components of frailty most strongly associated with disability. *The Journal of Nutrition Health and Aging, 15*, 684-689.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Beauchamp, M. R., Bray, S. R., & Albinson, J. G. (2002). Pre-competition imagery, self-efficacy and performance in collegiate golfers. *Journal of Sport Sciences, 20*(9), 697-705. doi: 10.1080/02640410232021940

Butler, A. J., Cazeaux, J., Fidler, A., Jansen, J., Lefkove, N., Gregg, M., . . . Wolf, S. L. (2011). The movement imagery questionnaire-revised, second edition (MIQ-RS) is a reliable and

valid tool for evaluating imagery in stroke populations. *Evidence-Based Complementary and Alternative Medicine, 2012,* 1-11. doi: 10.1155/2012/497289

Callow, N., Hardy, L., & Hall, C. (2001). The effects of a motivational general-mastery imagery intervention on the sport confidence of high-level badminton players. *Research Quarterly for Exercise and Sport, 72*(4), 389-400. doi: 10.1080/02701367.2001.10608975

Carter, J. E., & Kelly, A. E. (1997). Using traditional and paradoxical imagery interventions with reactant intramural athletes. *The Sport Psychologist, 11*(2), 175-189.

Chaplin, J. P., Krawiec, T. S. (1974). *Systems and theories of psychology* (3rd ed.). New York: Holt, Reinhart, & Winston.

Cooley, S. J., Williams, S. E., Burns, V. E., & Cumming, J. (2013) Methodological variations in guided imagery interventions using movement imagery scripts in sport: A systematic review. *Journal of Imagery Research in Sport and Physical Activity, 8*(1), 1-22. doi: 10.1515/jirspa-2012-0005

Cumming, J. (2008). Investigating the relationship between exercise imagery, leisure-time exercise behaviour, and self-efficacy. *Journal of Applied Sport Psychology, 20*(2), 184-198. doi: 10.1080/10413200701810570

Cumming, J., & Anderson, G. M. (2013). Guided imagery. In M. D. Gellman & J. R. Turner (Eds.), *Encyclopedia of behavioral medicine* (pp. 881-883). New York, NY: Springer.

Cumming, J., & Williams, S. E. (2013). Introducing the revised applied model of deliberate imagery use for sport, dance, exercise, and rehabilitation. *Movement and Sport Sciences, 82*, 69-81. doi: 10.1051/sm/2013098

Den Ouden, M. E. M., Schuurmans, M. J., Mueller-Schotte, S., Brand, J. S., & Van Der Schouw,

Y. T. (2013). Domains contributing to disability in activities of daily living. *Journal of the American Medical Directors Association, 14*, 18-24.

Devlin, A. L., & Wilson, P. H. (2010). Adult age differences in the ability to mentally transform object and body stimuli. *Aging, Neuropsychology and Cognition*, *17*(6), 709–729. doi: 10.1080/13825585.2010.510554

Fenker, R. M., & Lambiotte, J. G. (1987). A performance enhancement program for a college football team: One incredible season. *The Sport Psychologist, 1*(3), 224-236.

Fillenbaum, G. G. (2001). Activities of daily living. In G. L. Maddox (Ed.), *The encyclopedia of aging* (3rd ed., pp. 8-9) New York: Springer.

Fillenbaum, G. G. & Smyer, M. A. (1981). The development, validity, and reliability of the OARS multidimensional functional assessment questionnaire. *Journal of Gerontology, 36*, 428-434.

Fillenbaum, G. G. (1988; updated 1996). Multidimensional functional assessment of older adults: The Duke Older Americans Resources and Services Procedures. Hillsdale, N.J.: Erlbaum (available only from Center for the Study of Aging and Human Development, Duke University Medical Center, Durham, NC 27710).

Fortinsky, R. H., Covinsky, K. E., Palmer, R. M., & Landefeld, C. S. (1999). Effects of functional status changes before and during hospitalization on nursing home admission of older adults. *Journal of Gerontology: Medical Sciences, 54A*(10), M521-M526.

Gabbard, C., Cacola, P., & Cordova, A. (2011). Is there an advanced aging effect on the ability to mentally represent action?. *Archives of Gerontology and Geriatrics, 53*, 206-209. doi: 10.1016/j.archger.2010.10.006

Gammage, K. L., Hall, C. R., & Rodgers, W. M. (2000). More about exercise imagery. *The Sport Psychologist, 14*, 348-359.

Giacobbi, P. R. Jr., Buman, M. P., Dzierzewski, J., Aiken-Morgan, A. T., Roberts, B., Marsiske, M., . . . McCrae, C. S. (2014). Content and perceived utility of mental imagery by older adults in a peer-delivered physical activity intervention. *Journal of Applied Sport Psychology*. doi: 10.1080/10413200.2013.803502.

Giacobbi, P. R. Jr., Hausenblas, H. A., Fallon, E. A., & Hall, C. A. (2003). Even more about exercise imagery: A grounded theory of exercise imagery. *Journal of Applied Sport Psychology, 15*, 160-175.

Giacobbi, P. R. Jr., Hausenblas, H. A., & Penfield, R. D. (2005). Further refinements in the measurement of exercise imagery: The exercise imagery inventory. *Measurement in Physical Education and Exercise Science, 9*(4), 251-266. doi: 10.1207/s15327841mpee0904_4

Gill, T. M., Baker, D. I., Gottschalk, M., Peduzzi, P. N., Allore, H., & Byers, A. (2002). A program to prevent functional decline in physically frail, elderly persons who live at home. *The New England Journal of Medicine, 347*(14), 1068-1074.

Gill, T. M., Robinson, J. T., & Tinetti, M. E. (1997). Predictors of recovery in activities of daily living among disabled older persons living in the community. *Journal of General Internal Medicine, 12*, 757-762.

Gobbens, R. J. J., Luijkx, K. G., Wijnen-Sponselee, & Schols, M. G. A. (2010). In search of an integral definition of frailty: Opinions of experts. *Journal of the American Medical Directors Associations, 11*(5), 338-343.

Gobbens, R. J. J. & van Assen, M. A. (2014). The prediction of ADL and IADL disability using six physical indicators of frailty: A longitudinal study in the Netherlands. *Current Gerontology and Geriatrics Research, 2014*, 1-10.

Gobbens, R. J. J., van Assen, M. A., Luijkx, K. G., & Schols, J. M. (2012). Testing an integral conceptual model of frailty. *Journal of Advanced Nursing, 68*(9), 2047-2060.

Gregg, M., Hall, C., & Butler, A. (2007). The MIQ-RS: A suitable option for examining movement imagery ability. *eCAM, 7*(2), 249-257. doi: 10.1093/ecam/nem170

Guralnik, J. M., Fried L. P., & Salive, M. E. (1996) Disability as a public health outcome in the aging population. *Annual Reviews of Public Health, 17*, 25-46.

Hall, C. R., Mack, D. E., Paivio, A., & Hausenblas, H. A. (1998). Imagery use by athletes: Development of the Sport Imagery Questionnaire. *International Journal of Sport Psychology, 29*, 73-79.

Hall, C. R., & Martin, K. A. (1997). Measuring movement imagery abilities: a revision of the Movement Imagery Questionnaire. *Journal of Mental Imagery, 21*(1-2), 143–154.

Hall, C. R., Pongrac, J., & Buckolz, E. (1985). The measurement of imagery ability. *Human Movement Science, 4*, 107-118. doi: 10.1016/0167-9457(85)90006-5

Hardy, S. E. & Gill, T. M. (2004). Recovery from disability among community-dwelling older persons. *Journal of the American Medical Association, 291*(13), 1596-1602.

Hausenblas, H. A., Hall, C. R., Rodgers, W. M., & Munroe, K. J. (1999). Exercise imagery: Its nature and measurement. *Journal of Applied Sport Psychology, 11*, 171-180.

Hellstrom, K., Lindmark, B., Wahlburg, B., & Fugl-Meyer, A. R. (2003). Self-efficacy in

relation to impairments and activities of daily living disability in elderly patients with stroke: A prospective investigations. *Journal of Rehabilitative Medicine, 35*, 202-207. doi: 10.1080/16501970310000836

Isaac, A., Marks, D. F., & Russell, D. G. (1986). An instrument for assessing imagery of movement: The vividness of movement imagery questionnaire (VMIQ). *Journal of Mental Imagery, 10*(4), 23-30.

Jacobson, E. (1931). Electrical measurement of neuromuscular states during mental activities. *American Journal of Physiology, 96*, 115-121.

Jacobson, E. (1932). Electrophysiology of mental activities. *The American Journal of Psychology, 44*(4), 677-694.

Katz, S., Ford, A. B., Moskowitz, R. W., Jackson, B. A., & Jaffe, M. W. (1963). Studies of illness in the aged: The index of ADL: A standardized measure of biological and psychosocial function. *The Journal of the American Medical Association, 185*(12), 914-919.

Kim, B. H. & Giacobbi, P. R. Jr. (2009). The use of exercise-related mental imagery by middle-aged adults. *Journal of Imagery Research in Sport and Physical Activity, 4*(1), 1-40. doi: 10.2202/1932-0191.1031

Lang, P. J. (1979). A bio-informational theory of emotional imagery. *The Society for Psychophysiological Research, Inc.,16*(6), 495-512.

Lawton, M. P., & Brody, E. M. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *The Gerontologist, 9*(3), 179-186.

Lee, L., Avis, M., & Arthur, A. (2007). The role of self-efficacy in older people's decisions to

initiate and maintain regular walking as exercise- findings from a qualitative study. *Preventative Medicine, 45,* 62-65. doi: 10.1016/j.ypmed.2007.04.011

Lord, S. R., Castell, S., Corcoran J., Dayhew, J., Matters, B., Shan, A., & Williams, P. (2003). The effect of group exercise on physical functioning and falls in frail older people living in retirement villages: A randomized, controlled trial. *American Geriatrics Society, 51,* 1685-1692.

Luukinen, H., Lehtola, S., Jokelainen, J., Vaananen-Sainio, R., Lotovonen, S., & Koistinen, P. (2006). Prevention of disability by exercise among the elderly: A population-based, randomized, controlled trial. *Scandinavian Journal of Primary Health Care, 24,* 199-205.

Malouin, F., & Richards, C. L. (2010). Mental practice for relearning locomotor skills. *Journal of the American Physical Therapy Association, 90*(2), 240-251. doi: 10.2522/ptj.20090029

Malouin, F., Richards, C. L., & Durand, A. (2010). Normal aging and motor imagery vividness: Implications for mental practice training in rehabilitation. *Archives of Physical Medicine and Rehabilitation, 91,* 1122-1127. doi: 10.1016/j.apmr.2010.03.007

Malouin F., Richards C. L., Jackson P. L., Lafleur M. F., Durand A., & Doyon J. (2007). The Kinesthetic and visual imagery questionnaire (KVIQ) for assessing motor imagery in persons with physical disabilities: a reliability and construct validity study. *Journal of Neurologic Physical Therapy. 31*(1), 20–29. doi: 10.1097/01.NPT.0000260567.24122.64

Martel, L., Belanger, A., & Berthelot, J. (2002). Loss and recovery of independence among seniors. *Statistics Canada Catalogue no. 82-003, 13*(4), 35-48.

Martin, K. A., Moritz, S. E., & Hall, C. R. (1999). Imagery use in sport: A literature review and applied model. *The Sport Psychologist, 13,* 245-268.

McCusker, J., Bellavance, F., Cardin, S., Belzile, E. (1999). Validity of an activities of daily living questionnaire among older patients in the emergency department. *Journal of Clinical Epidemiology, 52,* 1023-1030.

Millan-Calenti, J. C., Tubio, J., Pita-Fernandez, S., Gonzales-Abraldes, I., Lorenzo, T., Fernandez-Arruty, T., & Maseda, A. (2010). Prevalence of functional disability in activities of daily living (ADL), instrumental activities of daily living (IADL) and associated factors, as predictors of morbidity and mortality. *Archives of Gerontology and Geriatrics, 50,* 306-310. doi: 10.1016/j.archger.2009.04.017

Monsma, E. V., Short, S. E., Hall, C. R., Gregg, M., & Sullivan, P. (2009). Psychometric properties of the revised movement imagery questionnaire (MIQ-R). *Journal of Imagery Research in Sport and Physical Activity, 4*(1), 1-14. doi: 10.2202/1932-0191.1027

Mor, V., Wilcox, V., Rakowski, W., & Hiris, J. (1994). Functional transitions among the elderly: patterns, predictors, and related hospital use. *American Journal of Public Health, 84*(8), 1274–1280.

Moritz, S. E., Hall, C. R., Martin, K. A., & Vadocz, E. (1996). What are confident athletes imaging?: An examination of image content. *The Sport Psychologist, 10*(2), 171-179.

Morris, T., Spittle, M., & Watt, A. P. (2005). *Imagery in sport.* Champaign, IL: Human Kinetics.

Mulder, T., Hochstenbach, J. B., van Heuvelen, M. J., & Den Otter, A. R. (2007). Motor imagery: The relation between age and imagery capacity. *Human Movement Science, 26,* 203–211. doi: 10.1016/j.humov.2007.01.001

Munnell, A. H. (2004). Population aging: It's not just the baby-boom. *An Issue in Brief: Center for Retirement Research at Boston College, 16,* 1-8.

Munroe, K. J., Giacobbi, P. R., Jr., Hall, C. R., & Weinberg, R. (2000). The four ws of imagery use: Where, when, why, and what. *The Sport Psychologist, 14*, 119-137.

Munroe-Chandler, K. J., & Gammage, K. L. (2005). Now see this: A new vision of exercise imagery. *Exercise and Sport Sciences Reviews, 33*(4), 201-205.

Munroe-Chandler, K. J., Hall, C. R., Fishburne, G. J., & Shannon, V. (2005). Using cognitive general imagery to improve soccer strategies. *European Journal of Sport Sciences, 5*(1), 41-49. doi: 10.1080/17461390500076592

Munroe-Chandler, K., & Morris, T. (2011). Imagery. In T. Morris & P. Terry (Eds.), *The New Sport and Exercise Psychology Companion* (pp. 275-308). Morgantown, WV: Fitness Information Technology.

Page, S. J., Levine, P., Sisto, S. A., & Johnston, M. V. (2001). Mental practice combined with physical practice for upper-limb motor deficits in subacute stroke. *Journal of the American Physical Therapy Association, 81*(8), 1455-1462.

Page, S. J., Sime, W., & Nordell, K. (1999). The effects of imagery on female college swimmers' perceptions of anxiety. *The Sport Psychologist, 13*(4), 458-469.

Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Science, 10*(4), 22-28.

Penninx, B. W. J. H., Messier, S. P., Rejeski, W. J., Williamson, J. D., DiBari, M., Cavazzini, C., . . . Pahor, M. (2001). Physical exercise and the prevention of disability in activities of daily living in older persons with osteoarthritis. *Archives of Internal Medicine, 161*, 2309–2316.

Phelan, E. A., Williams, B., Penninx, B. W. J. H., LoGerfo, J. P., & Leveille, S. G. (2004).

Activities of daily living function and disability in older adults in a randomized trial of the health enhancement program. *Journal of Gerontology: Medical Sciences, 59A*(8), 838-843.

Randhawa, B., Harris, S., & Boyd, L. A. (2010). The kinesthetic and visual imagery questionnaire is a reliable tool for individuals with Parkinson disease. *Journal of Neurologic Physical Therapy, 34*(3), 161-167. doi: 10.1097/NPT.0b013e3181e1aa71

Roberts, R. Callow, N., Hardy, L., Markland, D., & Bringer, J. (2008). Movement imagery ability: Development and assessment of a revised version of the vividness of movement imagery questionnaire. *Journal of Sport and Exercise Psychology, 30*, 200-221.

Saimpont, A., Malouin, F., Tousignant, B., & Jackson, P. L. (2013). Motor imagery and aging. *Journal of Motor Behavior, 45*(1), 21-28.

Saimpont, A., Mourey, F., Manckoundia, P., Pfitzenmeyer, P., & Pozzo, T. (2010). Aging affects the mental simulation/planning of the "rising from the floor" sequence. *Archives of Gerontology and Geriatrics, 51*, 41–45. doi: 10.1016/j.archger.2009.11.010

Saimpont, A., Pozzo, T., & Papaxanthis, C. (2009). Aging effects the mental rotation of left and right hands. *PLoS ONE, 4*(8), e6714. doi: 10.1371/journal.pone.0006714

Shelkey, M., & Wallace, M. (2012). Katz index of independence in activities of daily living (ADL). *Try this: Best Practices in Nursing Care to Older Adults, 2*, 1-2.

Sordoni, C., Hall, C., & Forwell, L. (2000). The use of imagery by athletes during injury rehabilitation. *Journal of Sport Rehabilitation, 9*, 329 – 338.

Sordoni, C., Hall, C., & Forwell, L. (2002). The use of imagery in athletic injury rehabilitation and its relationship to self-efficacy. *Physiotherapy Canada, Summer*, 177 – 185.

Statistics Canada. (2013). *Canada's population estimates: Age and sex, 2013* (Component of

Statistics Canada catalogue no. 11-001-X). Retrieved from http://www.statcan.gc.ca/daily-quotidien/131125/dq131125a-eng.pdf

Statistics Canada. (2011). Generations in Canada: Age and Sex, 2011 Census (Component of Statistics Canada catalogue no. 98-311-X2011003). Retrieved from http://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011003_2-eng.pdf

Stuck, A. E., Walthert, J. M., Nikolaus, T., Bula, C. J., Hohmann, C., & Beck, J. C. (1999). Risk factors for functional status decline in community-living elderly people: a systematic literature review. *Social Science and Medicine, 48*, 445-469.

Tamir, R., Dickstein, R., & Huberman, M. (2007). Integration of motor imagery and physical practice in group treatment applied to subjects with Parkinson's disease. *Nerorehabilitation and Neural Repair, 21*(1), 68-75. doi: 10.1177/1545968306292608

Tunney, N. M., Arnold, C. E., & Gimbel, L. M. (2011). Mental practice to facilitate learning when physical practice is unsafe: A pilot study. *Physical and Occupational Therapy in Geriatrics, 29*(3), 243-254. doi: 10.3109/02703181.2011.599481

Vadocz, E. A., Hall, C. R., & Moritz, S. E. (1997). The relationship between competitive anxiety and imagery use. *Journal of Applied Sport Psychology, 9*(2), 241-253. doi: 10.1080/10413209708406485

Vealey, R. S., & Greenleaf, C. A. (2010). Seeing is believing: Understanding and using imagery in sport. In J. M. Williams (Eds.), *Applied sport psychology: Personal growth to peak performance* (pp. 267-304). New York, NY: McGraw-Hill.

Wang, L., Van Belle, G., Kukull, W. B., Larson, E. B. (2002). Predictors of functional change: A

longitudinal study of nondemented people aged 65 and older. *Journal of American Geriatrics Society, 50*, 1525-1534.

Wesch, N. N., Milne, M. I., Burke, S. M., & Hall, C. R. (2006). Self-efficacy and imagery use in older adult exercisers. *European Journal of Sport Science, 6*(4), 197-203. doi: 10.1080/17461390601012512

White, A., & Hardy, L. (1998). An in-depth analysis of the uses of imagery by high-level slalom canoeists and artistic gymnasts. *The Sport Psychologist, 12*, 387-403.

APPENDICES

APPENDIX A

Demographics

Please answer / check the following as they apply to you.

1. Name:_____

2. Age:_____

3. Gender:
   - ☐ Male
   - ☐ Female
   - ☐ Other

4. Ethnicity:
   - ☐ White
   - ☐ Black
   - ☐ Hispanic
   - ☐ Asian / Pacific Islander
   - ☐ Aboriginal
   - ☐ Other

5. Marital Status:
   - ☐ Single
   - ☐ Married
   - ☐ Common-law
   - ☐ Divorced
   - ☐ Widowed
   - ☐ Other

6. Highest Level of Education:
   - ☐ Elementary / Grade school
   - ☐ Secondary / High school
   - ☐ College / University
   - ☐ Other

7. Have you used imagery / visualization before?
   - ☐ Yes
   - ☐ No

a. If answered Yes, please explain how you have used imagery / visualization before?

_____

APPENDIX B

Movement Imagery Questionnaire-Revised, Second Edition (MIQ-RS)

(Gregg, Hall, & Butler, 2007)

This questionnaire concerns two ways of mentally performing movements that are used by some people more than by others, and are more applicable to some types of movements than others. The first is attempting to form a visual image or picture of a movement in your mind. The second is attempting to feel what performing a movement is like without actually doing the movement. You are requested to do both of these mental tasks for a variety of movements in this questionnaire, and then rate how easy/difficult you found the tasks to be. The ratings that you give are not designed to assess the goodness or badness of the way you perform these mental tasks. They are attempts to discover the capacity individuals' show for performing these tasks for different movements. There are no right or wrong ratings or some ratings that are better than others.

Each of the following statements describes a particular action or movement. Read each statement carefully and then actually perform the movement as described. Only perform the movement a single time. Return to the starting position for the movement just as if you were going to perform the action a second time. Then, depending on which of the following you are asked to do, either (i) form as clear and vivid a visual image as possible of the movement just performed, or (ii) attempt to feel yourself making the movement just performed without actually doing it. After you have completed the mental task required, rate the ease/difficulty with which you were able to do the task. Take your rating from the following scales.

Rating Scales:

Visual Imagery Scale

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Kinesthetic Imagery Scale

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Be as accurate as possible and take as long as you feel necessary to arrive at the proper rating for each movement. You may choose the same rating for any number of movements ‘‘seen’’ or ‘‘felt’’ and it is not necessary to utilize the entire length of the scale.

1. Starting Position: Sit with your arms at your side and your feet on the floor.

Action: Raise one knee as high as possible. Now lower your leg so that you are again sitting with your two feet on the floor.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

---

2. Starting Position: While sitting, put your hand on your lap and make a fist.

Action: Raise your hand above your head until your arm is fully extended, keeping your fingers in a fist. Next, lower your hand back to your lap while maintaining a fist.

Mental task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

---

3. Starting Position: While sitting, extend your arm straight out to your side so that it is parallel to the ground, with your fingers extended and your palm down.

Action: Move your arm forward until it is directly in front of your body (still parallel to the ground). Keep your arm extended during the movement and make the movement slowly. Now move your arm back to the starting position, straight out to your side.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

4. Starting Position: Sit with your arm fully extended above your head.

Action: Slowly bend forward at the waist and try and touch your toes with your fingertips. Now return sitting with your arm extended above your head.

Mental task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

---

5. Starting Position: While sitting, put your hand in front of you about shoulder height as if you are about to push open a swinging door. Your fingers should be pointing upwards.

Action: Extend your arm fully as if you are pushing open the door, keeping your fingers pointing upwards. Now let the swinging door close by returning your hand and arm to your side.

Mental task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

---

6. Starting Position: While sitting, put your hand in your lap. Pretend you see a drinking glass on a table directly in front of you.

Action: Reach forward, grasp the glass and lift it slightly off the table. Now place it back on the table and return your hand to your lap.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it using your non-dominant arm. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

7. Starting Position: While sitting, your hand is at your side. Pretend there is a door in front of you that is closed.

Action: Reach forward, grasp the door handle and pull open the door. Now gently shut the door, let go of the door handle and return your arm to your side.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

---

8. Starting Position: Sit with your arms at your side and your feet on the floor.

Action: Raise one knee as high as possible. Now lower your leg so that you are again sitting with your two feet on the floor.

Mental task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

---

9. Starting Position: While sitting, put your hand on your lap and make a fist.

Action: Raise your hand above your head until your arm is fully extended, keeping your fingers in a fist. Next, lower your hand back to your lap while maintaining a fist.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

10. Starting Position: While sitting, extend your arm straight out to your side so that it is parallel to the ground, with your fingers extended and your palm down.

Action: Move your arm forward until it is directly in front of your body (still parallel to the ground). Keep your arm extended during the movement and make the movement slowly. Now move your arm back to the starting position, straight out to your side.

Mental task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

---

11. Starting Position: Sit with your arm fully extended above your head.

Action: Slowly bend forward at the waist and try and touch your toes with your fingertips. Now return sitting with your arm extended above your head.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

---

12. Starting Position: While sitting, put your hand in front of you about shoulder height as if you are about to push open a swinging door. Your fingers should be pointing upwards.

Action: Extend your arm fully as if you are pushing open the door, keeping your fingers pointing upwards. Now let the swinging door close by returning your hand and arm to the starting position.

Mental task: Assume the starting position. Attempt to feel yourself making the movement just performed without actually doing it. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to feel	Hard to feel	Somewhat hard to feel	Neutral (not easy Not hard)	Somewhat easy to feel	Easy to feel	Very easy to feel

Rating: _____

13. Starting Position: While sitting, put your hand in your lap. Pretend you see a drinking glass on a table directly in front of you.

Action: Reach forward, grasp the glass and lift it slightly off the table. Now place it back on the table and return your hand to your lap.

Mental Task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

---

14. Starting Position: While sitting, your hand is at your side. Pretend there is a door in front of you that is closed.

Action: Reach forward, grasp the door handle and pull open the door. Now gently shut the door, let go of the door handle and return your arm to your side.

Mental Task: Assume the starting position. Attempt to see yourself making the movement just performed with as clear and vivid a visual image as possible. Now rate the ease/difficulty with which you were able to do this mental task.

1	2	3	4	5	6	7
Very hard to see	Hard to see	Somewhat hard to see	Neutral (not easy Not hard)	Somewhat easy to see	Easy to see	Very easy to see

Rating: _____

APPENDIX C

Measure of Self-efficacy for Performing ADL and IADL

1. Please rate below how confident you are in completing your instrumental activities of daily living on a scale ranging from 0% to 100%. Instrumental activities of daily living refer to activities required to live independently, activities are typically more complex than activities of daily living (e.g., preparing meals, shopping, managing money, doing housework, using the telephone, and taking medications).

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Instrumental Activities of Daily Living Rating: _____

2. Please rate below how confident you are in completing your activities of daily living on a scale ranging from 0% to 100%. Activities of daily living refer to basic tasks performed to maintain the self (e.g., eating, dressing, bathing, toileting, transferring into and out of a bed or chair, and getting around the house).

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Activities of Daily Living Rating: _____

APPENDIX D

Older Americans Resources and Services Activities of Daily Living Questionnaire (OARS ADL)

(Fillenbaum, 1996)

I'd like to ask you about some of your activities of daily living, things that we all need to do as part of our daily lives. I would like to know if you can do these activities without any help at all, or if you do need some help to do them, or if you can't do them at all. Please circle the number that best corresponds to your ability to perform the stated activity.

Instrumental Activities of Daily Living

1. Can you use the telephone...
   - 2 without help, including looking up numbers and dialing;
   - 1 with some help (can answer phone or dial operator in an emergency, but need a special phone or help in getting the number or dialing; or
   - 0 are you completely unable to use the telephone?
   - - Not answered

2. Can you get to places out of walking distance...
   - 2 without help (drive your own car, or travel alone on buses, or taxis);
   - 1 with some help (need someone to help you or go with you when travelling); or
   - 0 are you unable to travel unless emergency arrangements are made for a specialized vehicle like an ambulance?
   - - Not answered

3. Can you go shopping for groceries or clothes (assuming you have transportation)...
   - 2 without help (taking care of all shopping needs yourself, assuming you had transportation);
   - 1 with some help (need someone to go with you on all shopping trips); or
   - 0 are you completely unable to do any shopping?
   - - Not answered

4. Can you prepare your own meals...
   - 2 without help (plan and cook full meals yourself);
   - 1 with some help (can you prepare some things but unable to cook full meals yourself); or
   - 0 are you completely unable to prepare any meals?
   - - Not answered

5. Can you do your housework...
   - 2 without help (can clean floors, etc.);
   - 1 with some help (can do light housework but need help with heavy work); or
   - 0 are you completely unable to do any housework?
   - - Not answered

6. Can you take your own medicine...
   - 2 without help (in the right doses at the right time);
   - 1 with some help (able to take medicine if someone prepares it for you and/or reminds you to take it); or

0 are you completely unable to take your medicines?
- Not answered

7. Can you handle your own money...
2 without help (write checks, pay bills, etc.);
1 with some help (manage day-to-day buying but need help with managing your checkbook and paying your bills); or
0 are you completely unable to handle money?
- Not answered

Activities of Daily Living

8. Can you eat...
2 without help (able to feed yourself completely);
1 with some help (need help with cutting, etc.); or
0 are you completely unable to feed yourself?
- Not answered

9. Can you dress and undress yourself...
2 without help (able to pick out clothes, dress and undress yourself);
1 with some help; or
0 are you completely unable to dress and undress yourself?
- Not answered

10. Can you take care of your own appearance, for example combing your hair and (for men) shaving...
2 without help;
1 with some help; or
0 are you completely unable to maintain your appearance yourself?
- Not answered

11. Can you walk...
2 without help (except from a cane);
1 with some help from a person or with the use of a walker, or crutches, etc.; or
0 are you completely unable to walk?
- Not answered

12. Can you get in and out of bed...
2 without any help or aids;
1 with some help (either from a person or with the aid of some device); or
0 are you totally dependent on someone else to lift you?
- Not answered

13. Can you take a bath or shower...
2 without help;
1 with some help (need help getting in and out of the tub, or need special attachments on the tub); or
0 are you completely unable to bathe yourself?
- Not answered

14. Do you ever have trouble getting to the bathroom on time?
2 No

1 Yes
0 Have a catheter or colostomy
- Not answered

APPENDIX E

Letter to Recruit at an Organization

Dear *[insert name]*,

My name is Emily Guerin and I am a Master's student in Human Kinetics at the University of Windsor, studying under the supervision of Dr. Krista Chandler (chandler@uwindsor.ca)

For my thesis, I am investigating imagery use and activities of daily living (ADL) in older adults. The results obtained from this study will contribute to existing literature on imagery and older adults, as well as an applied understanding of how imagery could be used as an effective self-management tool for older adults.

With your permission, I would appreciate visiting *[insert name of organization]* prior to *[insert name of program]* to recruit participants from amongst your members to take part in my study. I will remain at the *[insert name of program]* for about 15 minutes to promote and recruit participants. In addition, I would like to leave a poster and my contact information at the *[insert name of organization]* for any potential participants. Please note that this study has received clearance from the University of Windsor Research Ethics Board.

For more information, I have attached a letter of information. If you are willing to have me visit *[name of organization]*, or have any questions, please contact me via e-mail (guerine@uwindsor.ca) or phone (519-253-3000 ext. 4997).

Thank you,

Emily Guerin

Master's Student in Human Kinetics
Department of Kinesiology
University of Windsor
401 Sunset Ave
Windsor, ON N9B 3P4

APPENDIX F

Recruitment Poster

WE NEED YOUR HELP!

Are you interested in participating in research regarding activities of daily living (ADL)?

Participants are needed for a study investigating imagery use and ADL in older adults! If you are 65 years of age or older, and living independently please contact me if you are interested in getting involved!

guerine@uwindsor.ca

519-253-3000 ext. 4997

Emily Guerin, MHK Candidate

Ethics clearance has been received from the University of Windsor Research Ethics Board

APPENDIX G

Verbal Recruitment Script

Hello, my name is Emily Guerin and I am completing my Master's degree at the University of Windsor, under the supervision of Dr. Krista Chandler. For my thesis I am conducting research on imagery use and activities of daily living in older adults. Participants will be required to take part in a six week guided imagery intervention. To participate you must be 65 years of age or older and living independently. Would you be interested in participating in my study?

If you are interested or willing to participate I have a letter of information stating the purpose and outlining the methods of the study for you to keep and review, a consent form for you to complete, and a form for you to fill out to provide me with your contact information. Please resubmit your completed consent form and your contact information to me if you are willing to participate in my study. I will be contacting you to confirm and schedule your availability for a workshop within the upcoming week.

APPENDIX H

LETTER OF INFORMATION TO PARTICIPATE IN RESEARCH

The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living

You are asked to participate in a research study conducted by Emily Guerin under the supervision of Dr. Krista Chandler, from the Faculty of Human Kinetics at the University of Windsor. Results obtained from this research study will contribute to the completion of a Masters degree in the Faculty of Human Kinetics.

If you have any questions or concerns about the research, please feel free to contact Emily Guerin at XXX-XXX-XXXX or guerine@uwindsor.ca, or Dr. Krista Chandler at 519-253-3000 ext. 2446 or chandler@uwindsor.ca.

PURPOSE OF THE STUDY

The purpose of this study is to examine the use and impact of imagery by older adults on their activities of daily living and instrumental activities of daily living.

PROCEDURES

If you volunteer to participate in this study, you will be asked to participate in an intervention for six weeks. The breakdown of the study is as follows:

WEEK 1 (Pre-intervention)

Participants will attend a workshop on imagery. The workshop will be approximately 2-3 hours and will be held at a location that is conveniently located. Participants will be required to arrange transportation to and from the workshop. Participants will be reimbursed by the researcher if they are required to pay for parking. Throughout the workshop participants will be provided with information about what is mental imagery and how to use imagery.

As well, participants will be introduced to guided imagery scripts. Over the course of the workshop, participants will be required to provide information on their activities of daily living and instrumental activities of daily living that they take part in throughout a typical day. This information will be used to develop your own personal guided imagery script. The guided imagery scripts will be developed by the researcher with input from each participant.

Finally, participants will be asked to complete three short questionnaires, including the Movement Imagery Questionnaire-Revised, Second Edition, a measure of self-efficacy for

performing activities of daily living and instrumental activities of daily living, and the Older Americans Resources and Services Activities of Daily Living Questionnaire. The questionnaires will be collected before and after the intervention. Demographic information will be collected as well.

WEEK 2-5 (Intervention)

Participants will be required to read and image the guided imagery script, approximately 5 minutes in length, a minimum of three times per week. As well, participants will be required to complete a daily tracking sheet of the number of times they imaged throughout a day/week. Reminders to read and image the guided imagery script will be provided to participants via telephone throughout the study.

WEEK 6 (Post-intervention)

Participants will be interviewed to discuss their use of imagery and the perceived impact imagery had on their activities of daily living and instrumental activities of daily living. Participants will also be required to complete three short post questionnaires at the time of the interview. The questionnaires will be identical to those completed at the workshop. The interviews and any instruction required to complete the questionnaires will be provided by the researcher. The interviews will take place at a convenient location for the participant. It will take approximately 90 minutes for the interview and the questionnaires to be completed. Each interview will be audio recorded.

AUDIO RECORDING

Audio recording is a voluntary procedure and you are free to withdraw at any time by requesting that the recording be stopped. However, if you do not wish to be recorded you will not be part of the study. You will not be revealed to anyone and all of the information on the tapes will be kept confidential. Files will only be numbered and will be stored in a locked cabinet in the lead researcher's office. The audio files are for research use only. The files will be appropriately disposed of after the study is completed.

POTENTIAL RISKS AND DISCOMFORTS

There are no known or anticipated risks from imaging activities of daily living or instrumental activities of daily living.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Participants may benefit from their involvement in the research through an increased exposure to research and imagery. By participating in the research, participants may acquire a new skill (i.e., imagery) which they may be able to use in a variety of situations.

The information gained from this study may be used in subsequent studies. The researchers may gain valuable insight regarding imagery use and older adults.

COMPENSATION FOR PARTICIPATION

Refreshments and nutritional snacks will be provided by the researcher during the workshop and interviews. In addition, if participants are required to pay for parking while they attend the workshop they will be reimbursed by the researcher.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can identify you will remain confidential and will be disclosed only with your permission. All data collected will be kept in strict confidentiality. If we find information we are required by law to disclose, we cannot guarantee confidentiality. The information obtained from the study will not be used for any purpose other than the research and the communication of the results. All data obtained from the study will be kept in a locked cabinet in the lead researcher's office. There is no access to this cabinet by anyone other than the researcher. The questionnaires, audio files, and field notes will be appropriately disposed of once the study is complete. There is the potential that confidentiality could be violated by someone participating in the study; however, we will encourage confidentiality between participants. We are capable of promising confidentiality of information, but cannot promise that the other participants will observe each other's privacy.

PARTICIPATION AND WITHDRAWAL

Participation in this study is voluntary. If you volunteer to be in this study, you may withdraw at any time. You may also refuse to answer any questions you do not want to answer and still remain in the study. You may withdraw data you provided at any time before data analysis ensues. The researcher may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of the study's finding can be found on the University of Windsor's REB website (www.uwindsor.ca/reb), at the conclusion of the study. If you wish to receive any additional information regarding this research, please contact the researchers via e-mail (guerine@uwindsor.ca or chandler@uwindsor.ca).

Date when results are available: August 1, 2015

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications, and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____

Signature of Investigator Date

Please keep a copy of this letter for your records.

APPENDIX I

CONSENT TO PARTICIPATE IN RESEARCH

The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living

You are asked to participate in a research study conducted by Emily Guerin under the supervision of Dr. Krista Chandler, from the Faculty of Human Kinetics at the University of Windsor. Results obtained from this research study will contribute to the completion of a Masters degree in the Faculty of Human Kinetics.

If you have any questions or concerns about the research, please feel free to contact Emily Guerin at XXX-XXX-XXXX or guerine@uwindsor.ca, or Dr. Krista Chandler at 519-253-3000 ext. 2446 or chandler@uwindsor.ca.

PURPOSE OF THE STUDY

The purpose of this study is to examine the use and impact of imagery by older adults on their activities of daily living and instrumental activities of daily living.

PROCEDURES

If you volunteer to participate in this study, you will be asked to participate in an intervention for six weeks. The breakdown of the study is as follows:

WEEK 1 (Pre-intervention)

Participants will attend a workshop on imagery. The workshop will be approximately 2-3 hours and will be held at a location that is conveniently located. Participants will be required to arrange transportation to and from the workshop. Participants will be reimbursed by the researcher if they are required to pay for parking. Throughout the workshop participants will be provided with information about what is mental imagery and how to use imagery.

As well, participants will be introduced to guided imagery scripts. Over the course of the workshop, participants will be required to provide information on their activities of daily living and instrumental activities of daily living that they take part in throughout a typical day. This information will be used to develop your own personal guided imagery script. The guided imagery scripts will be developed by the researcher with input from each participant.

Finally, participants will be asked to complete three short questionnaires, including the Movement Imagery Questionnaire-Revised, Second Edition, a measure of self-efficacy for

performing activities of daily living and instrumental activities of daily living, and the Older Americans Resources and Services Activities of Daily Living Questionnaire. The questionnaires will be collected before and after the intervention. Demographic information will be collected as well.

WEEK 2-5 (Intervention)

Participants will be required to read and image the guided imagery script, approximately 5 minutes in length, a minimum of three times per week. As well, participants will be required to complete a daily tracking sheet of the number of times they imaged throughout a day/week. Reminders to read and image the guided imagery script will be provided to participants via telephone throughout the study.

WEEK 6 (Post-intervention)

Participants will be interviewed to discuss their use of imagery and the perceived impact imagery had on their activities of daily living and instrumental activities of daily living. Participants will also be required to complete three short post questionnaires at the time of the interview. The questionnaires will be identical to those completed at the workshop. The interviews and any instruction required to complete the questionnaires will be provided by the researcher. The interviews will take place at a convenient location for the participant. It will take approximately 90 minutes for the interview and the questionnaires to be completed. Each interview will be audio recorded.

AUDIO RECORDING

Audio recording is a voluntary procedure and you are free to withdraw at any time by requesting that the recording be stopped. However, if you do not wish to be recorded you will not be part of the study. You will not be revealed to anyone and all of the information on the tapes will be kept confidential. Files will only be numbered and will be stored in a locked cabinet in the lead researcher's office. The audio files are for research use only. The files will be appropriately disposed of after the study is completed.

POTENTIAL RISKS AND DISCOMFORTS

There are no known or anticipated risks from imaging activities of daily living or instrumental activities of daily living.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Participants may benefit from their involvement in the research through an increased exposure to research and imagery. By participating in the research, participants may acquire a new skill (i.e., imagery) which they may be able to use in a variety of situations.

The information gained from this study may be used in subsequent studies. The researchers may gain valuable insight regarding imagery use and older adults.

COMPENSATION FOR PARTICIPATION

Refreshments and nutritional snacks will be provided by the researcher during the workshop and interviews. In addition, if participants are required to pay for parking while they attend the workshop they will be reimbursed by the researcher.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can identify you will remain confidential and will be disclosed only with your permission. All data collected will be kept in strict confidentiality. If we find information we are required by law to disclose, we cannot guarantee confidentiality. The information obtained from the study will not be used for any purpose other than the research and the communication of the results. All data obtained from the study will be kept in a locked cabinet in the lead researcher's office. There is no access to this cabinet by anyone other than the researcher. The questionnaires, audio files, and field notes will be appropriately disposed of once the study is complete. There is the potential that confidentiality could be violated by someone participating in the study; however, we will encourage confidentiality between participants. We are capable of promising confidentiality of information, but cannot promise that the other participants will observe each other's privacy.

PARTICIPATION AND WITHDRAWAL

Participation in this study is voluntary. If you volunteer to be in this study, you may withdraw at any time. You may also refuse to answer any questions you do not want to answer and still remain in the study. You may withdraw data you provided at any time before data analysis ensues. The researcher may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of the study's finding can be found on the University of Windsor's REB website (www.uwindsor.ca/reb), at the conclusion of the study. If you wish to receive any additional information regarding this research, please contact the researchers via e-mail (guerine@uwindsor.ca or chandler@uwindsor.ca).

Date when results are available: August 1, 2015

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications, and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Participant

_____ _____
Signature of Participant Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____
Signature of Investigator Date

APPENDIX J

Contact Information

Name:_____

Phone:_____

E-mail:_____

APPENDIX K

Daily Tracking Sheet **Name:**_____

On the table below please circle the number of times that you read your imagery script each day. Please see back for recommendations on imagery.

	Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Week 1			Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image
Week 2	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image
Week 3	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image
Week 4	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image
Week 5	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image	Imaged more than 2 times Imaged 2 times Imaged 1 time Did not image				

Imagery

Imagery is defined as creating or recreating images in one's mind.

Recommendations for imaging:

- Practice daily or a minimum of three times a week.
- Try to incorporate as many of the senses as possible, such as sight, sound, taste, smell, touch, and kinesthetic (i.e., the feel of a movement).
- Practice in a quiet place without distractions.
- Maintain a positive approach.

APPENDIX L

Re-Consent Form

I hereby confirm that I am willing to continue participating in the study **The Influence of Imagery Use in Older Adults on Activities of Daily Living and Instrumental Activities of Daily Living** as stated under the terms of the letter information.

_____
Name

_____
Signature

_____
Date

APPENDIX M

Imagery Script: Worksheets

Please list in order your typical morning routine starting with getting out of bed.

1. Get out of bed

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

Generic Imagery Script

Please read the generic imagery script below. Feel free to add, remove, or change the imagery script to match your typical morning routine.

See yourself sitting up in bed and moving your bedding off your body with ease. Notice how you smoothly slide your feet over the side of the bed and reach your feet down to touch the floor. Feel yourself effortlessly move from a sitting position to a standing position. Picture yourself confidently walking into the bathroom and closing the door behind you. See yourself using the toilet with ease. Once finished notice how you steadily walk over to the sink and turn on the faucet. You thoroughly wash your hands with soap and warm water. You turn off the faucet and dry your hands on the hand towel in the bathroom.

See yourself steadily walk out of the bathroom and into the kitchen. Imagine yourself preparing your breakfast. You choose the necessary dishes and utensils and set them on the counter. See yourself easily opening the fridge and cupboards to obtain the items necessary for you to make your breakfast. You make your breakfast and then carry and set it on the table. You pull out the chair from the table and carefully sit down. You eat and enjoy your delicious breakfast. After you have finished eating, you steadily stand up from your chair at the table. You pick up your dirty breakfast dishes and utensils from the table and put them in the dishwasher to be cleaned.

Following your breakfast, picture yourself confidently walking back into the bathroom and closing the door behind you. Notice how you smoothly pull the shower curtain closed and turn on the water. You put your hand under the water and feel that it is the perfect temperature. You undress with ease and safely climb into the shower. You close the shower curtain tightly from inside the shower, and wash your hair and body with soap. Once finished you turn off the water and smoothly pull the shower curtain open. You steadily climb out of the shower, grab a

towel, and dry your hair and body. You wrap your towel around your body and walk to your bedroom.

Once in your bedroom, see yourself pick out an outfit for the day from your wardrobe and set it on your bed. Notice how you effortlessly put on your clothes. You look in the mirror and adjust your clothes. Then you grab your hairbrush and comb through your wet hair. You style your hair effortlessly. Finally, you look in the mirror one last time and realize you look and feel great!

Select two additional activities of your choice to include in your imagery script.
Note: the activities do not need to be from your typical morning routine.

Activity 1:_____

Describe activity below.

_____

_____

_____

Activity 2:_____

Describe activity below.

_____

_____

_____

VITA AUCTORIS

NAME:	Emily Guerin
PLACE OF BIRTH:	London, ON
YEAR OF BIRTH:	1991
EDUCATION:	John McGregor Secondary School, Chatham, ON, 2009
	University of Windsor, B.H.K. (Hons) Movement Science, Windsor, ON, 2013
	University of Windsor, M.H.K., Windsor, ON, 2015